

Preliminary Results of the European Standard Battery Epicutaneous Tests at the Dermatology Hospital of Bamako

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Abstract

Original Research Article

Contact dermatitis is a frequent reason for consultation in dermatology. In recurrent and erythrodermic forms, patch testing in search of an allergenic substance is necessary. The aim of this study is to describe the preliminary results of patch testing using the standard European battery at the Dermatology Hospital of Bamako. This was a descriptive cross-sectional study conducted at the Dermatology Hospital of Bamako over a period of two years. All patients screened for recurrent or extensive eczema were included. The patch tests performed were those of the standard European battery. After application of the allergens, the tests were read at 48 and 72 hours. During the study 5777 cases of eczema were detected, 29 patients presenting a recurrent and/or extensive form were tested, of which 28 patients had a positive test at 72 hours (96%): 17/29 males (56%) and 12/25 females, i.e. a sex ratio of 1.42. The mean age of the patients was 39 years (range 7-72 years). With the exception of 1 patient, all patients were poly-sensitized: 9 patients reacted to 2 allergens, 9 others to three allergens and 6 to at least 5 allergens. Potassium dichromate was found 12 times, paraphenylenediamine 7 times, nickel 5 times and finally epoxy resin and fragrance mix 3 times each. In Africa, in the absence of suitable test batteries, the standard European battery was used. The positivity rates observed in our series are higher than those reported in other African populations. Although the detection of an allergen alone is not sufficient to explain a clinical picture, it is possible that the poly-sensitization observed in our cases could be one of the consequences of exposure to several allergens. In addition, it would have been interesting to explore the role of phytotherapy in the clinical pictures observed in our cases.

Keywords: Preliminary results, epi-skin test, European standard battery, hospital, dermatology, Bamako.

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INTRODUCTION

Contact eczema is the first reason for consultation at the dermatology hospital in Bamako. Their increasing frequency over the last three decades is largely due to the development of industrial technology [1, 2]. The multiplicity of products and the complexity of incriminating allergens make an etiological approach based solely on clinical findings increasingly difficult. The search for an allergenic substance is essential in recurrent and erythrodermic forms. Epicutaneous tests have therefore become an almost unavoidable necessity when the possibility exists. Unfortunately, this is not the case in most African countries. Countries like Benin and Nigeria have started to use the European standard batteries in recent years with a hospital proportion of 16% and 20% respectively. In recent years, the dermatology hospital in Bamako has been able to

request patch tests due to the availability of standard allergen battery tests.

The aim of this work is to describe the preliminary results of the European standard battery patch tests at the dermatology hospital of Bamako.

METHODS

We conducted a descriptive cross-sectional study during a two-year period (2019- 2021) at the dermatology hospital of Bamako.

Study population:

All patients consulting for eczema during the study period

Case definition: All patients screened for recurrent or extensive eczema were included.

Inclusion criteria: Patients meeting the case definition were included in this study.

Non-inclusion criteria: Patients with incomplete records and patients who were lost to follow-up were not included in this study.

Study Design:

Patch testing was performed using the European standard allergen battery in patients in complete remission and in the absence of any dermocorticoid treatment for at least about two months.

The allergens are applied to the back of the patients.

Patch test readings are taken at 48 hours and 72 hours. This reading takes place 30 minutes after the tests have been removed.

The results are interpreted according to the coding established by the International Contact Dermatitis Research Group (ICDRG) and then by the European Environmental and Contact Dermatitis Research Group (EECDRG).

Ethical aspects: The anonymity of the cases is guaranteed and the inclusion did not involve any danger for the cases.

Materials and data analysis

Data are collected on an individual survey form, entered into Microsoft Office Word and Excel 2013. The data will be analysed on the French epi info 7 software with a statistical test of p. value, interval 95 percent.

RESULTS

In total, out of 5777 patients seen for contact dermatitis problems, 29 were able to benefit from the test, i.e., 0.50%. The male sex was 17 cases (58.62%) against 12 cases for the female sex (41.38%). The age range of 0-14 years was 2 patients (6.90%), 15-24 years 4 patients (13.79%), 25-39 years 11 patients (37.93%), 40-59 years 10 patients (34.48%) and 60 years and over 2 patients (6.90%). In our series shopkeepers, pupils/students and secretaries represent 13.79% each. Teachers, doctors, managers and housewives accounted for 6.90% each.

Potassium dichromate were found in 48%, paraphenyl ne diamine in 31,03% (Table 1). The characteristics of the tests are presented in Tables 2, 3 & 4.

Table 1: Distribution of the sample according to the allergens found

Allergens	Percentage of positivity	
	Number	
Potassium dichromate	14	48,27
Paraphenylene Diamine free base	9	31,03
Thiuram Mix	2	6,90
Neomycin sulfate	3	10,34
Cobalt chloride	4	13,79
Benzocaine	5	17,24
Nickel sulphate	6	20,69
Clioquinol	1	3,45
Colophonium	0	0,00
Paraben Mix	4	13,79
N-Isopropyl-N-Phenyl-4-Phenyl-4-phenylenediamine IPPD	4	13,79
Lanoline	3	10,34
Mercapto Mix	4	13,79
Epoxy resin	4	13,79
Balsam of perou	0	0,00
4-tert Butylphenol Formaldehyde Resin	6	20,69
Mercapto-bezothiazole	2	6,90
Formaldehyde (in water)	4	13,79
Fragrance Mix I	4	13,79
Sesquiterpene Lactone Mix	3	10,34
Quaternium 15	2	6,90
Methoxy-6-n-pentyl-4-benzoquinone	3	10,34
M�thylchloroisothiaziline (khaton cg) in water	4	13,79
Budesonide	1	3,45
Tixocortol 21-pivalate	5	17,24
Methyldibromoglutaronitrile (dibromo-dicyanobutane)	4	13,79
Fragrance Mix II	3	10,34
Hydroxy-isohehexyl-3-cyclohexene	2	6,90
Methyl-isothiazoline	3	10,34
Textile dye Mix	12	41,38

Table 2: Distribution of the sample according to allergen positivity by gender

Allergens	Sex				Staff
	M	(%)	F	(%)	
Potassium dichromate	9	(64,29)	5	(35,71)	14
Paraphenyl�ne Diamine free base	5	(55,55)	4	(45,45)	9
Thiuram Mix	1	(50)	1	(50)	2
Neomycin sulfate	3	(100)	0	(00)	3
Cobalt chloride	2	(50)	2	(50)	4
Benzocaine	3	(80)	2	(20)	5
Nickel sulphate	2	(33,33)	4	(66,67)	6
Clioquinol	0	(00)	1	(100)	1
Colophonium	0	(00)	0	(00)	0
Paraben Mix	3	(75, 0)	1	(25, 0)	4
N-Isopropyl-N-Phenyl-4-Phenyl-4-phenylenediamine IPPD	3	(75, 0)	1	(25, 0)	4
Lanoline	2	(66,67)	1	(33,33)	3
Mercapto Mix	2	(50, 0)	2	(50, 0)	4
Epoxy resin	0	(00)	4	(100)	4
Balsam of perou	0	(00)	0	(00)	0
4-tert Butylphenol Formaldehyde Resin	3	(50)	3	(50)	6
Mercapto-bezothiazole	1	(50)	1	(50)	2
Formaldehyde (in water)	3	(75)	1	(25)	4
Fragrance Mix I	2	(50)	2	(50)	4
Sesquiterpene Lactone Mix	0	(00)	3	(100)	3
Quaternium 15	1	(50)	1	(50)	2
Methoxy-6-n-pentyl-4-benzoquinone	1	(33,33)	2	(66,67)	3
M�thylchloroisothiaziline (khaton cg) in water	3	(75)	1	(25)	4
Budesonide	1	(100)	0	(00)	1
Tixocortol 21-pivalate	4	(80)	1	(20)	5
Methyldibromoglutaronitrile (dibromo-dicyanobutane)	3	(75)	1	(25)	4
Fragrance Mix II	0	(00)	3	(100)	3
Hydroxy-isohexyl-3-cyclohexene	2	(100)	0	(00)	2
Methyl-isothiazoline	1	(33,33)	2	(66,67)	3
Textile dye Mix	8	(66,67)	4	(33,33)	12

Table 3: Distribution of the sample according to the allergens found by age group

Allergens	Age group					Staff
	0-14 years	15-24 years	25-39 years	40-59 years	60 and more	
Potassium dichromate	1	2	7	3	1	14
Paraphenyl�ne Diamine free base	1	1	7	0	0	9
Thiuram Mix	0	0	1	0	1	2
Neomycin sulfate	0	1	1	1	0	3
Cobalt chloride	0	0	2	0	2	4
Benzocaine	0	0	4	0	0	4
Nickel sulphate	0	2	3	1	0	6
Clioquinol	0	0	1	0	0	1
Colophonium	0	0	0	0	0	0
Paraben Mix	0	0	2	1	1	4
N-Isopropyl-N-Phenyl-4-Phenyl-4-phenylenediamine IPPD	0	1	2	1	0	4
Lanoline	0	0	3	0	0	3
Mercapto Mix	0	1	2	0	1	4
Epoxy resin	1	0	2	0	1	4
Balsam of perou	0	0	0	0	0	0
4-tert Butylphenol Formaldehyde Resin	1	2	1	1	1	6
Mercapto-bezothiazole	0	0	1	0	1	2
Formaldehyde (in water)	0	1	1	2	0	4

Allergens	Age group					Staff
	0-14 years	15-24 years	25-39 years	40-59 years	60 and more	
Fragrance Mix I	0	1	2	1	0	4
Sesquiterpene Lactone Mix	0	0	1	1	1	3
Quaternium 15	0	0	1	1	1	3
Methoxy-6-n-pentyl-4-benzoquinone	0	2	1	0	0	3
Méthylchloroisothiaziline (khaton cg) in water	0	1	2	1	0	4
Budesonide	0	0	0	1	0	1
Tixocortol 21-pivalate	0	0	3	2	0	5
Methyldibromoglutaronitrile (dibromo-dicyanobutane)	0	1	3	0	0	4
Fragrance Mix II	0	1	0	1	1	3
Hydroxy-isohehexyl-3-cyclohexene	0	0	2	0	0	2
Methyl-isothiazoline	0	2	1	0	0	3
Textile dye Mix	1	2	6	3	0	12

Table 4: Distribution of the sample according to the number of positive allergens in the same patient

Number of positive allergens	Staff	Percentage
No allergen	1	3,45
One allergen	1	3,45
Two allergens	7	24,13
Three allergens	7	24,13
Four allergens	3	10,35
Five allergens	1	3,45
Six allergens	5	17,24
Seven allergens	2	6,90
Twelve allergens	1	3,45
Twenty allergens	1	3,45
Total	29	100

DISCUSSION

The points of discussion on this work will mainly concern the methodology and the results. Regarding the results, we will analyse the positivity rate, then the different allergens found.

The Methodology

The most important remark is the very low number of patients tested compared to the number of subjects seen in consultation. Indeed, out of 5777 patients seen for contact dermatoses, only 29 were able to benefit from the test. This limited number can be explained by the fact that the untested cases were sufficiently suggestive. Their origin can be easily deduced from the questioning and clinical examination. There was therefore a strong selection of patients. This strong selection explains the high rate of positivity. However, this study allowed us to describe the allergens found in the dermatology hospital of Bamako.

Socio-demographic data:

Sex: men were in the majority to perform the test with 58.62% than women, that is to say a sex ratio of 1.42. This result was contrary to that found by H.G. YEDOMON and colleagues from Benin who had a sex ratio of 0.48 and that of Olusola Ayanlowo and colleagues from Nigeria who had a sex ratio of [3, 4].

Age ranges: The mean age was 36 years with extremes of 9 to 72 years. The mean age in a cumulative series of patients tested in Nigeria and Benin was 26 and 30 years respectively [3]. The majority of our patients tested were young adults, which is consistent with the African literature.

Occupations: the majority of the occupations were pupils/students, secretaries and shopkeepers with a percentage of 13.79% each, doctors and housewives with a percentage of 6.90% each. In the Beninese series, the majority of professions were pupils/students 33.33%, workers 35.89%, and civil servants 23.09% [3, 4].

Positivity rate: In our cohort the high percentage of positivity (96.55%) could be explained by the selection criteria of our patients which were based on recurrence and erythrodermisation. This result is higher than those in the sub-region in Benin and Nigeria which have a relatively low percentage with a positivity rate of 69.2% and 61% respectively [3, 4]. In developed countries such as Malaysia Fei Yin Ng *et al.*, found a rate of 77.4%, in Singapore GOH C L *et al.*, 49.2% and in the UK Mark I *et al.*, 71% [3-5].

Allergens found: Sensitisation is a function of individual terrain, but also of the environment, which depends, among other things, on the professional

environment, the setting and the lifestyle. In the present study, the most frequent allergens, namely potassium dichromate, paraphenylene, textiles, nickel and formaldehyde, were found to be the most common. All allergens tested were positive except colophonium which was negative. This could be explained by the absence of painters in our series. Only one patient tested negative. Among the positive testers, 1 (3.45%) was sensitised to one allergen, 7 (24.13%) were sensitised to two and three allergens and 14 (48.27%) were polysensitised to more than four allergens. Men hydroxy-isohehexyl-3-cyclohexene, neomycin sulfate and budenoside were 100%. Clioquinol, epoxy resin, lactone mix, Fragrance mix 2 were all 100% in women. Potassium dichromate was the most common allergen found in our series followed by textile and nickel. Potassium dichromate ranked first in our series which was in agreement with the Beninese series and contrary to the Nigerian series where dichromate ranked fourth [3, 6]. In the European and Asian literature lanolin and nickel were ranked first respectively [7, 8]. In our series, patients with poly-sensitivity to two and three allergens were predominantly in the age range of 25-60 years, the closer to childhood and the older the patient, the less sensitised they were. Although the identification of an allergen alone is not sufficient to explain a clinical picture, it is possible that the poly-sensitisation noted in our cases could be one of the consequences of exposure to several allergens. In addition, it would have been interesting to explore the role of phytotherapy in the clinical pictures observed in our cases.

CONCLUSION

This shows that the European standard battery in skin testing of Malian patients with allergic contact dermatitis. Our work highlights the need to develop patch tests adapted to our context.

Conflict of Interest: None

Authors' Contributions: All authors have read and approved the final version.

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