

The Role of Skin Microbiota in the Clinical Course of Allergic Dermatoses

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ABSTRACT

We examined 369 patients with various forms of allergic dermatoses at the age from 6 months to 72 years. All patients underwent clinical (determination of the DISS index) and microbiological studies. The control group consisted of 54 healthy individuals of the corresponding age.

KEYWORDS: allergic dermatoses, skin microbiota, staphylococcus

INTRODUCTION

Recently, special attention has been paid to opportunistic microorganisms that inhabit biosubstrates of the skin, mucous membranes of the human body. The number of microorganisms and their species composition on the surface of the skin of healthy people are characterized by a certain constancy. Various forms of homeostasis disorders, including skin diseases, reduce its protective properties and change the composition of microflora. The interaction of the patient's body and microorganisms can be determined by both increased colonization of flora and sensitization of the macroorganism to it, as a result of which infectious agents can play a direct role in maintaining not only infectious, but also allergic inflammation.

The purpose of the research is to assess the state of the skin microbiota in the clinical course of allergic skin diseases.

MATERIALS AND METHODS

We examined 369 patients with various forms of allergic dermatoses at the age from 6 months to 72 years. All patients underwent clinical (determination of the DISS index) and microbiological studies. The control group consisted of 54 healthy individuals of the corresponding age.

Microbiological studies were characterized by bacterioscopic and cultural studies of skin flakes from lesions in patients with allergic dermatoses. For culture studies, 5% blood agar, Endo, Kligler's medium, as well as salt agar with the addition of mannitol were used, and incubation was carried out in a thermostat at 36.8°C degrees.

RESULTS

The results of microbiological studies showed that out of 389 ALD patients, 156 gram + chemoorganotrophic facultative anaerobic bacteria from the Mycrocoaceae family were seeded from the skin of the lesions, which amounted to 40.1%. The sowing rate of staphylococcal microflora was observed in all clinical forms of ALD, (Table 6) Among them, 81 (51.9%) were males and 75 (48.05%) females.

Among 156 patients with allergic dermatoses by nosological form, 47 (30.1%) patients were

diagnosed with allergic dermatitis, 20 (12.8%) with urticaria, 22 (14.1%) with toxicoderma and 67 (42.9%) - atopic dermatitis. According to the age category up to 14 years, there were 42 (26.9%) patients, 15-20 years old - 21 (13.5%), 21-30 years old - 30 (19.2%), 31-40 years old - 22 (14, 1%), 41-50 years old - 14 (8.9%) and over 50 years old - 27 (17.3%) patients.

Table 1. Sowing rate of microorganisms *Staphylococcus* spp. in patients with allergic dermatoses (%)

Patients with ALD	Staphylococcus spp.	ALD, N=149	AD, N=165	Urticaria, N=37	Toxicoderma, N=38
N=389	156 (40,1%)	47 (31,5%)	67 (40,6%)	20 (54,1%)	22 (57,9%)

As can be seen from Table 1, according to the nosological form of ALD among 149 patients with allergic dermatitis, *Staphylococcus* spp. Was sown in 47 patients, which amounted to 31.5%. While in patients with AD, it was sown out of 165 in 67 (40.6%), in the group of patients with urticaria - in 20 (54.1%) of 37 and in the group of patients with toxicoderma - in 22 out of 38, which amounted to 57.9%, respectively.

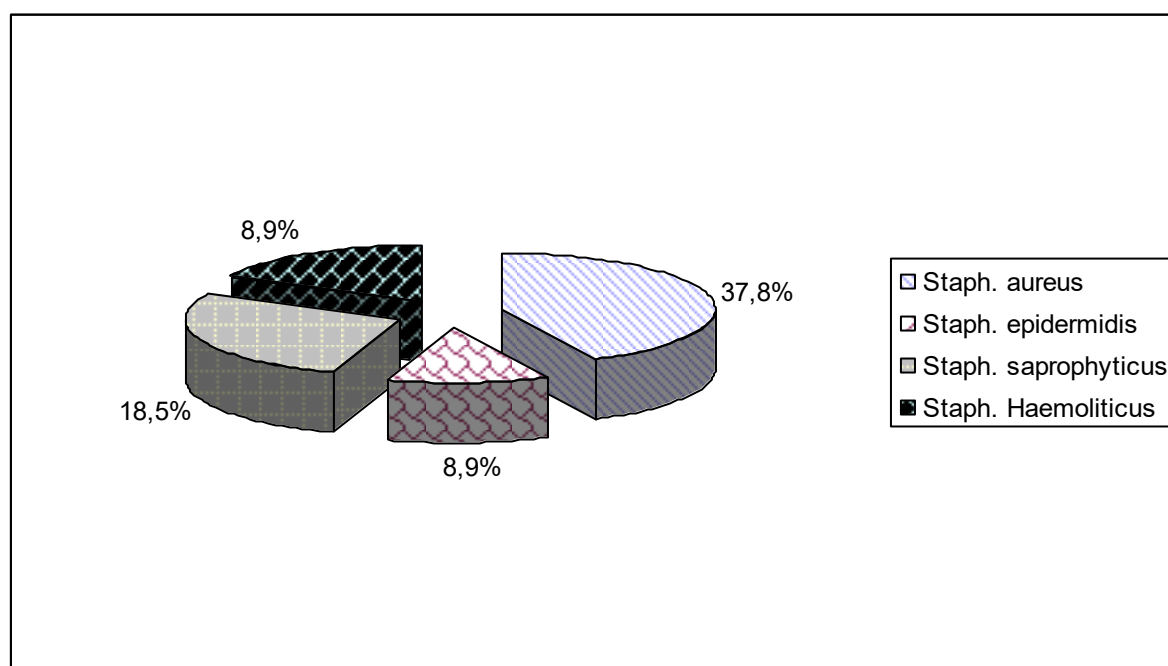
Determination of the species of *Staphylococcus* spp. in patients with ALD showed the following features of cultivation (table 2).

Table 2. Species identification of *Staphylococcus* spp. in patients with allergic dermatoses (%)

Group	Staph. aureus	Staph. epidermidis	Staph. saprophyticus	Staph. Haemoliticus
ALD, N=47	15 (31,9%)	7(14,9%)	23 (48,9%)	5 (10,6%)
AD, N=67	33(49,3%)	5(7,5%)	8 (11,9%)	8 (11,9%)
Toxicoderma, N=22	8 (36,4%)	2 (9,1%)	5 (22,7%)	4 (18,2%)
Urticaria, N=20	3 (15,0%)	3 (15,0%)	2 (10%)	7(35,0%)
Total, N=156	59 (37,8%)	17 (10,8%)	38 (24,4%)	24 (15,4%)
Control group, N=36	2 (5,6%)	19 (52,8%)	14 (38,9%)	-

As can be seen from Table 2, the growth of conditionally pathogenic forms of Staph microorganisms is noted on the skin of the control group of healthy individuals. epidermidis - in 19 (52.8%), Staph. saprophyticus in 14 (38.9%), while the pathogenic form Staph. aureus was sown in only 2 individuals, which was 5.6%. Whereas in patients with allergic dermatoses, Staph. aureus - 59 (37.8%), Staph. Saprophyticus - 38 (24.4%) and further Staph. Epidermidis - in 17 (10.7%) and Staph. Haemoliticus - 24 (15.4%), respectively. (Fig. 1)

Figure 1. Indicator of species identification of Staphylococcus spp. in patients with allergic dermatoses



Depending on the nosology of allergic dermatoses in the group of patients with ALD, 15 out of 47 patients were seeded with Staph. Aureus (31.9%), Staph. Epidermidis - in 7 (14.9%), Staph. Saprophyticus - 23 (48.9%), Staph. Haemoliticus - 5 (10.6%), respectively. In the group of patients with AD, the largest amount of seeding was shown by Staph. Aureus - in 33 out of 67 (49.3%), in the group of patients with toxicoderma - Staph. Aureus - 8 (36.4%) and in the group of patients with urticaria - Staph. Haemoliticus - 7 (35.0%), respectively.

The study of the severity, taking into account the DISS index in patients with allergic dermatoses, showed the following features. (table 3).

Table 3. Indicator of the severity of patients with allergic dermatoses according to the DISS index (%)

Nosology	Mild	Moderate	Severe
ALD, N=47	12 (25,5%)	19 (40,4%)	16 (34,04%)
AD, N= 67	15 (22,4%)	21 (31,3%)	31 (46,3%)
Toxicoderma, N=22	-	6 (27,3%)	16 (72,7%)
Urticaria, N= 20	5 (25,0%)	9 (45,0%)	6 (30,0%)
Total, N=156	32 (20,5%)	55 (35,3%)	69 (44,2%)

As follows from Table 3, among 156 patients with ALD, the largest number of patients - 69 (44.2%) - was with severe severity with an average value of 24.6 ± 1.8 , while 55 (35.3%) had an average the severity of the disease was 18.2 ± 0.8 points, and 32 (20.5%) had a mild severity and the DISS index averaged 17.9 ± 0.5 points, respectively.

The seeding rate of staphylococcal flora was most often noted in patients with severe - 44.2% and moderate - 35.3% of cases, respectively.

Table 4. Characteristics of the species spectrum of Staphylococcus spp. in patients with allergic dermatoses, depending on the severity of the disease (%)

	Staph. aureus	Staph. epidermidis	Staph. saprophyticus	Staph. Haemolyticus
Mild, N= 32	3 (9,4%)	7 (21,8%)	14 (43,7%)	2 (6,3%)
Moderate, N= 55	19(34,5%)	8 (14,5%)	18 (32,7%)	9 (16,4%)
Severe, N=69	37 (53,6%)	2 (2,9%)	6 (8,7%)	13 (18,8%)
Total, N=156	59	17	38	24

Species identification study of Staphylococcus spp. taking into account the severity, showed that with a mild severity of ALD, the largest amount of seeding was observed for Staph. Saprophyticus - 43.7% (14 out of 32 patients), then Staph. Epidermidis - 21.8% (7), while the more pathogenic forms of St. Aureus and St. Haemolyticus - were sown in smaller quantities - 9.4% and 6.3%, respectively. With moderate severity of ALD in 34.5% (19 of 55) -St. aureus and St. Saprophyticus - 32.7% (18), respectively. And with severe severity, the pathogenic flora of St. Aureus - 53.6% (37 out of 69) and Staph. Haemolyticus - 18.8% (13) of cases.

It should be noted that in a microbiological study of the skin of lesions in patients with ALD, microbial contamination with Staphylococcus spp. Was noted in 20 (12.8%) cases. a combination of two pathogenic forms of St. Aureus + St. Haemolyticus - 5 (25%), St. Aureus + St. Saprophyticus - 6 (30%), St. Aureus + St. Epidermidis and St. Saprophyticus + St. Haemolyticus - 3 (15%) cases, respectively. (table 5).

Table 5. Microbial contamination with Staphylococcus spp. on the skin of patients with allergic dermatoses (%)

Contamination	ALD N=47	AD N= 67	Toxicoderma N=22	Urticaria N= 20	Total
Enterobacteriaceae spp.+ st.aureus	1				1
St. Aureus+ St. Haemolyticus	1	4			5
St. Aureus+ St. Saprophyticus	2	2	1	1	6
St. Aureus+ St. Epidermidis	1	1		1	3
Enterobacteriaceae spp.+ St. Haemolyticus		1			1
St. Aureus+ Str. Viridans			1		1

St. Saprophyticus + St. Haemolyticus	1		1	1	3
Total	6	8	3	3	20

Analyzing the results of clinical and microbiological studies, we can say that in patients with ALD, there is an increase in the pathogenic flora of Staphylococcus spp. in 40.1% of cases. (156 out of 389). According to the nosological form of dermatoses, Staphylococcus spp. in 31.5% of cases it was sown in patients with allergic dermatitis, in patients with AD - 40.6%, in the group of patients with urticaria - in 54.1% and toxicoderma - in 57.9%, respectively. According to the species of microorganisms in patients with allergic dermatoses, Staph. aureus - 59 (37.8%), Staph. Saprophyticus - 38 (24.4%) and further Staph. Epidermidis - in 17 (10.7%) and Staph. Haemoliticus - 24 (15.4%), respectively. In 12.8% of cases, microbial contamination of pathogenic forms of Staphylococcus spp. Was observed, which causes the development of a mixed-bacterial form of an invasive process on the skin in lesions in patients with ALD.

CONCLUSION

1. In patients with allergic skin diseases, there is an increased seeding rate of staphylococci - 40.1%.
2. According to the clinical form, the greatest amount of sowing was observed in patients with atopic dermatitis - 40.6%, allergodermatitis - 31.5%.
3. By species identification, S. aureus - 37.8%, S. Saprophyticus - 24.4% and S. Haemoliticus - 15.4%, respectively, were often sown.
4. The seeding rate of staphylococcal flora was most often noted in patients with severe - 44.2% and moderate - 35.3% of cases, respectively.

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