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Study of sensitivity to systemic antibiotics s. Epidermidis and s. Aureus in patients with moderate and severe acne

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Abstract: The sensitivity of S. epidermidis and S. aureus isolated from patients with moderate and severe acne to minocycline, doxylan, tetracycline and erythromycin in the treatment of this pathology. The antibiotic sensitivity of isolated strains was determined by the disco diffusion method on Mueller-Hinton agar in accordance with the guidelines. The data obtained make it possible to recommend the drugs minocycline and doxylan for clinical use in the treatment of patients with moderate to severe acne in dermatological practice.

Keywords: Acne, staphylococci, antibiotic resistance, antibacterial drugs.

Introduction: Antibiotics (AB) are used to treat bacterial and fungal infections (they do not affect viruses). AB successfully fight severe bacterial infections that the human immune system cannot cope with on its own. They can kill bacteria or stop their reproduction, allowing natural defense mechanisms to eliminate them. Antibiotic resistance (AR) is the resistance of bacteria to an antibiotic, i.e. the antibiotic becomes familiar, habitual for the bacteria and ineffective for treatment. The causes of ABR can be - widespread use of antibacterial drugs (ABP), taking AB without indications, violation of AB intake regimens, AB content in food products, etc. Only with a full course (!) of antibiotic therapy (ABT) does the bacteria die. If the course is interrupted, then during this time the bacteria only weaken under the influence of AB, but do not die. Also, incomplete courses of ABT are one of the reasons for the development of bacterial resistance to AB.

Microbiome resistance (MR) to antimicrobials and antibiotics is recognized as a serious public health problem worldwide [4]. When prescribing antibiotics, it is necessary to consider the entire spectrum of their antimicrobial action, since P. acnes is not the only microorganism responsible for the development of

inflammatory reactions in patients with acne. The main representatives of the resident microbiome in acne patients are Cutibacterium acnes (C. acnes) and Staphylococcus epidermidis (S. epidermidis), while the transient microbiome mainly consists of Staphylococcus aureus (S. aureus) [1]. Based on the results of scientific and clinical studies conducted in recent years, it has been suggested that the pathophysiology of inflammatory forms of acne is not so much involved in known pathogens, but rather in the imbalance of microorganisms living on the skin or "dysbacteriosis" of the skin microflora [2].

Systemic antibiotics are used to treat moderate to severe acne: minocycline, doxycycline, tetracycline and erythromycin. All types of coagulase-negative and Staphylococcus aureus are generally characterized by a high frequency of isolation of resistant forms, a high level and a wide spectrum of acquired resistance to antibiotics. At the same time, the indicators of acquired resistance in individual types of staphylococci, in relation to different drugs and depending on the habitat (hospital, community environment, surgical hospitals) have significant differences, which should be taken into account in the tactics of treatment and prevention of diseases caused by them [5,6,8]. The aim of the study was to evaluate the sensitivity of S. epidermidis and S. aureus isolated from patients with moderate to severe acne to systemic antibiotics, namely minocycline, doxylane (doxycycline), tetracycline (tetracycline group) and erythromycin (macrolide group) in the treatment of this pathology.

METHODS

The study material consisted of clinical samples taken from patients with moderate (n= 42) and severe (n= 29) acne. A total of 71 people were examined for this purpose. Staphylococcal microflora was cultured from facial skin using the print method and identified using the standard scheme [3]. The culture was performed on blood and yolk-salt agar (YSA). Antibiotic sensitivity of isolated strains was determined using the disk diffusion method on Mueller-Hinton agar in accordance with the guidelines [9]. Statistical data processing was performed using a program embedded in Microsoft Excel.

RESULTS AND DISCUSSION

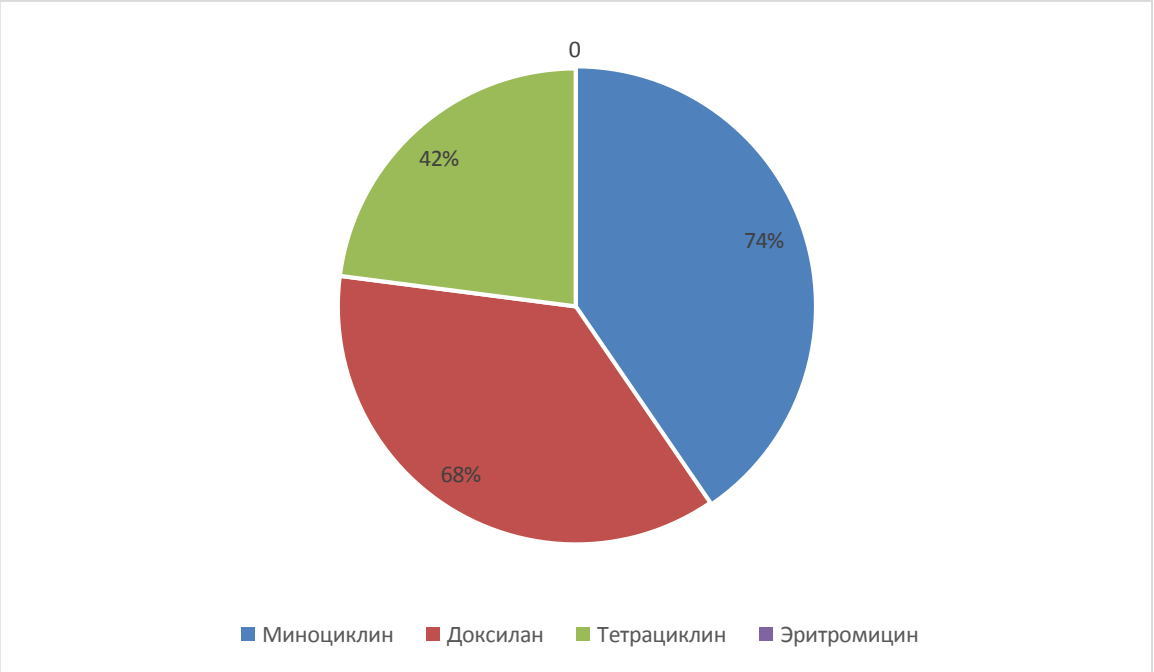
The assessment of the sensitivity of the isolated strains of S. epidermidis and S. aureus to various antibiotics is presented in diagrams 1 and 2.

Diagram 1

Sensitivity of S. epidermidis strains (n=23) to antimicrobial drugs isolated from patients with moderate to severe acne, tetracycline and macrolide antibiotics (in %).

Diagram 2

Sensitivity of S. aureus strains (n=19) to antimicrobial drugs isolated from patients with moderate and severe acne, tetracycline and macrolide antibiotics (in %).



The results of the studies show that among the S. epidermidis cultures (23 of 71), cultures resistant to erythromycin were more common (74% - in 17 patients). The least resistance of the S. epidermidis culture from the studied antibiotics was to tetracycline (39% - 9), doxylan (26% - 6) and minocycline (22% - 5) (diagram 3).

Diagram 3

Resistance of S. epidermidis strains (n=23) to antimicrobial drugs isolated from patients with moderate and severe acne, to tetracycline and macrolide antibiotics (in %).

All isolated S.aureus strains (in 19 patients) were resistant to erythromycin (100%), which confirms the complete acquisition of resistance of S.aureus to erythromycin [7]. Resistance to tetracycline was 58% (in 11 patients). Resistance to minocycline and doxylane was at the level of -26% (in 5 patients) and 32% (in 65 patients), respectively (diagram 4).

Diagram 4.
Resistance of S. aureus strains (n=19) to antimicrobial drugs isolated from patients with moderate and severe acne, to tetracycline and macrolide antibiotics (in %).

The problem of antibiotic resistance of diseases caused by staphylococci is still relevant. Year after year, their resistance to ABP is becoming increasingly alarming.

CONCLUSIONS

1. S. epidermidis and S. aureus strains were highly sensitive to minocycline and doxylan.

2. Erythromycin demonstrated the lowest efficacy against S. epidermidis.

3. All isolated S. aureus strains were characterized by absolute resistance to erythromycin.

4. The obtained data allow us to recommend minocycline and doxylan for clinical use in the treatment of patients with moderate to severe acne in dermatological practice.

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