**Original article**

# The evaluation of bacterial colonization on skin lesions of hospitalized patients in dermatology department of Ahvaz

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## Abstract

**Introduction and objective:** A large number of microorganisms live on normal skin as commensals. When the skin is inflamed or otherwise abnormal, bacteria usually regarded as non-pathogenic on body surface may assume the role of opportunist pathogens. In this study we evaluated bacterial colonization on skin lesions of admitted patients in dermatology department in a teaching hospital.

**Materials and methods:** Samples were collected from lesions and sent to medical microbiology laboratory for microbial study. Samples were cultured on suitable media and incubated at 37°C. All isolated bacteria were identified using microscopic and biochemical tests.

**Results:** Among 42 patients, who took part in the study, 24 were females and 18 were males. The most common microorganism found was Staphylococcus coagulase positive followed by was *Staphylococcus* coagulase positive (24) followed by *Enterobacter* species (5) and *Pseudomonas aeroginosa* (3). Four patients had infectious diseases. Other diagnosed diseases in the study groups were; pemphigus vulgaris, Stevenson Johonson syndrome, psoriasis, erythema multiforme, and erythroderma.

**Conclusion:** The role of normal skin resident flora in diseased conditions has been goal of many studies. This study is important became it was for the first time which has been carried out in Ahvaz area with a huge sampling.

**Keywords:** Skin lesions, Bacterial colonization, *Staphylococcus aureus*

## Introduction

The normal human skin is colonized by huge numbers of bacteria that live as commensals on its surface [1]. At times bacteria not normally found there may colonize the epidermis and lead rapidly to disease. Apart from these pathogenic organisms, a wide range of bacteria land fortuitously on the skin, but are unable to multiply. Organisms not normally considered as skin flora may sometimes colonize it [1]. When the skin is inflamed or abnormal, it is often difficult to determine whether an organism isolated is causing or contributing to the observed pathology. If the skin is damaged or the immune status of the subject impaired, bacteria usually regarded as non-pathogenic in body surface may assume the role of opportunist pathogens. Within a given species, there are also strain differences in virulence [1].

Some strains have a particular tendency to cause disease, perhaps due to greater adherence to epithelial cells or enzyme production [1]. There are some studies investigating skin flora on healthy and ill population to find out any possible relation between disease and microbial flora of skin [2,3]. In this study, we planned to study the species of bacterial colonization on diseased skin of hospitalized patients in dermatology ward.

## Materials and methods

Forty-two patients, with skin disease entered the study. Samples were taken by cotton swab from skin lesions exuda of consecutively hospitalized patients in dermatology ward, during October 2008 to May 2009. Swabs were cultured on different media, consisting of Blood agar (Pronadisa, Spain), MacConkey agar (Pronadisa) and EMB agar (Pronadisa) and incubated at 37°C. Moreover, different tests applied were; catalase, $H_2O_2$ 30%, Triple Sugar Iron (TSI) and oxidase. Microorganisms were recognized on the basis of microscopic and differential tests.

## Results

A total of 42 patients were evaluated, of whom 24(57.1%) were males and 18(42.9%) females. The patients aged 7-88 year-old and most of them belonged to 20-39 age groups. The patients age group were ≤19, 3 (7.2%); 20-39, 14 (33.3%); 40-59, 11 (26.2%); 60-79, 9 (21.4%); ≥80, 5 (11.9%). All samples were taken within the first day of admission. The most frequent species detected was *Staphylococcus* coagulase positive (24) followed by *Enterobacter* species (5) and *Pseudomonas aeroginosa* (3). We could not detect any microorganism in seven samples. Data on anatomical site, age, gender are shown in table 1. Among admitted patients four had infectious diseases, namely, leishmaniasis (1), actinomycosis (1), and infected eczema (2). Other diagnoses were pemphigus vulgaris, Stevens Johnson syndrome, psoriasis, erythema multiform, and erythroderma.

## Discussion

The concept of a stable normal resident flora composed of large numbers of organisms belonging to relatively few species is well established. There are some variations from subject to subject and perhaps in a given subject with time [1]. The resident aerobic flora consists of Gram-positive cocci of *Staphylococcus* species, *Micrococcus* species and a variety of Gram-positive rods, Diphtheroids. The number of species of the genus Staphylococcus is steadily increasing. Currently, 41 species are described [2]. Most of the species are harmless and have never been associated with any kind of infection; however, some species of this genus cause a variety of diseases by production of a series of enzymes and toxins [2].

There are some studies comparing skin microbial flora. Berlau *et al*. [3] studied the distribution of *Acintobacter* species and found over 40% of 192 healthy volunteers who carried *Acintobacter* species at one or more body sites. Hall [4] in a study looked for the prevalence of methicillin resistant *Staphylococcus aureus* (MRSA) in nursing home residents, reported an average of 20-35% prevalence. The microbial flora on inflamed or diseased skin may be different from normal skin [1]. In a study, Durdu *et al*. [5] investigated T-Zank smear findings in 400 patients with erosive, vesicular, bullous and postular skin lesions, bacterial culture for cocci were positive in 25 samples.

**Table1:** Data on anatomical site, and gender

| Microorganims | Anatomical site | Female | | Male | | Total | |
|---|---|---|---|---|---|---|---|
| | | No | % | No | % | No | % |
| Enterobacter | Leg | 3 | 20% | 2 | 9.5% | 5 | 13.9% |
| *P. aeroginosa* | Leg | 0 | 0.0% | 1 | 4.7% | 1 | 2.7% |
| *E. coli* | Leg | 0 | 0.0% | 1 | 4.7% | 1 | 2.7% |
| Staph. coagulase+ | Leg | 0 | 0.0% | 1 | 4.7% | 1 | 2.7% |
| Staph. coagulase+ | Trunk | 5 | 33.3% | 8 | 38.1% | 13 | 36.1% |
| *P. aeroginosa* | Trunk | 1 | 6.7% | 0 | 0.0% | 1 | 2.7% |
| Proteus | Face | 1 | 6.7% | 0 | 0.0% | 1 | 2.7% |
| Staph. coagulase+ | Back | 0 | 0.0% | 4 | 19% | 4 | 11.1% |
| Diphtheroid | Back | 1 | 6.7% | 0 | 0.0% | 1 | 2.7% |
| *P. aeroginosa* | Back | 1 | 6.7% | 0 | 0.0% | 1 | 2.7% |
| Staph. coagulase+ | Neck | 0 | 0.0% | 1 | 4.7% | 1 | 2.7% |
| Staph. coagulase+ | Scalp | 0 | 0.0% | 1 | 4.7% | 1 | 2.7% |
| Staph. coagulase+ | Genitalia | 0 | 0.0% | 1 | 4.7% | 1 | 2.7% |
| Micrococci | Retro auricular | 1 | 6.7% | 0 | 0.0% | 1 | 2.7% |
| Staph. coagulase+ | Groin | 1 | 6.7% | 0 | 0.0% | 1 | 2.7% |
| Staph. coagulase+ | Arm | 1 | 6.7% | 1 | 4.7% | 2 | 5.6% |
| Total | | 15 | 100% | 21 | 100% | 36 | 100% |

In our study, most common microorganism on both infected and apparently non-infected skin was *Staphylococcus* species, which accounted for about 66.7% of all cultured microorganisms. The isolated organisms from diseased or abnormal skin could not be easily determined whether are causing or contributing to observed pathology. In our study, 90% of the diagnosed cases were non-infected including: pemphigus vulgaris, Stevens Johnson syndrome, psoriasis erythema multiforme, and erythroderma. Coagulase negative Staphylococci are members of the normal skin flora and resist against colonization by pathogenic bacteria. *S. epidermidis* is the main pathogen of the group. In the other healthy patients it is probably an occasional cause of minor skin infections including superficial folliculitis.

Secondary infection of pre-existing dermatoses such as eczema seemed not to occur. *S. epidermidis* was not detected in our study. This may be because of the small number of our study group or accuracy defaults in the laboratory process. The major streptococcal pathogens in humans belong to group A, collectively referred to as Streptococcus pyogenes [1]. It is widely assumed that skin damage, albeit minor, is necessary for development of naturally occurring Streptococci pyoderma. We also did not detect this organism on all damaged skin of our patients. *P. aeroginosa*, an aerobic, Gram-negative microorganism, was found in three of the patients as a transient member of the skin flora. *P. aeroginosa* can be existed in the anogenital region, axillae and external ear. It readily colonizes burns, ulcers or other moist skin lesions.

Gram-negative organism Acintobacter is found as members of the resident skin flora in about 20% of normal subjects and it's main importance is due to being an uncommon opportunistic pathogens [6]. We could not find any similar study in the literature, although there are many studies concerning normal flora in many skin conditions like eczema or atopic dermatitis.

Gang *et al*. [7] in a double blind multicenter study evaluated skin colonization by *S. aureus* in patients with eczema and atopic dermatitis. They isolated that microorganism in 70.2% of lesional and 32.7% of non-lesional skin samples. In addition to inflammation or other abnormalities of skin, application of topical like oils may cause a greater propensity for bacterial colonization [8].

## Conclusion

The role of normal skin resident flora in diseased conditions has been the goal of many studies. To find out an accurate estimate of normal flora microorganisms in our region and the role of skin normal flora on skin lesions, a study with a larger number of cases and control group should be carried out.

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