

IDENTIFICATION OF THE *STAPHYLOCOCCUS AUREUS* FROM PURULENT SECRETIONS

Popovici Raluca*

*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania, e-mail: rugeraluca@yahoo.com

Abstract

Considering the purposes and means of diagnosis of a laboratory of medical analyses, it is necessary that the preliminary identification to point to the prominence, with an acceptable degree of probability, of the species most frequently involved in the infectious pathology. The microscopic aspect, as a series of phenotypic characters as are the aspect of the colonies on non selective medium, together with a limited set of enzymatic tests allow the preliminary identification of the species more frequently isolated from the staphylococcus infections.

Keywords: *Staphylococcus aureus*, colonies, species, non selective mediums.

INTRODUCTION

Staphylococcus aureus colonizes the nasal vestibule and the mucous of the cavitory organs with communication to exterior, where it contaminates frequently the tegument, preferring the areas with increased humidity. The percentage of the carriers varies between 20-4-% among the healthy adults and reaches up to 40-70% in the hospital medium. The human species of *Staphylococci* coagulate negatively, colonize the nostrils and the tegument.

Many of the infections with *Saphylococcus aureus* have the aspect of a nosocomial breakings with different localizations.

The infections with *Staphylococcus aureus* methicillin-resistant, with multiple resistance to antibiotics, including all the antibiotics β lactamic and often the macrolides, aminoglycosides are difficult to command, especially when the evolve in the hospital medium.

Staphylococci are developed easily in 18-24 hours, on simple nutritive mediums in aerobiosis. The vitamin B1 and the niacin are indispensable factors for growth. Some rare versions of *Saphylococcus aureus* are developed only in the presence of CO₂ or of other metabolites.

The optimum temperature of growth of *Staphylococcus* is 37°C and the optimum ph is of 7.5 but are tolerated greater variations.

MATERIAL AND METHODS

The biological samples used are represented by purulent secretions taken from the patients in the conditions of sterility and seeded on culture mediums, Levin, Chapman, broth.

The solid mediums for the isolation of the staphylococci can be non selective, differential and selective.

1) The standard nutritive agar is a nonselective medium, usual, that brings about a greater number of bacteria, inclusively of staphylococci. On this medium can be showed up the form, the dimension and the pigmetogenesis of the colonies of staphylococci.

2) The agar enriched with 5% buck blood represents a non selective medium, being the most used solid medium for the seeding of the sampled tests and designated for the isolation of the staphylococci. On this medium is underlined also the type of hemolysis.

The Chapman medium (hyperclorurate agar with mannitol and red phenol) is a selective medium used for the isolating of the staphylococci from the contaminated samples and for the differentiation of the positive mannitol species. The presence of the high concentration of salt assured the inhibition of the growth of the non halotolerant bacteria.

The degradation of the mannitol is characteristic for the *Staphylococcus aureus aureus* subspecies and can be present at some negative coagulant species.

With the help of the test for oxidasis (indolphenoloxidasis) is accomplished the differentiation of the staphylococci of medical interest (negative oxidasis) by some similar types, respectively *Micrococcus*, *Dermacoccus* etc, that are positive oxidases.

The test with the help of which is distinguished the activity of the scavenger enzyme helps the differential diagnosis compared to other species of pathogen cocci, especially, streptococci and pneumococci. The staphylococci are catalyzed positively, while the streptococci and pneumococci don't have a scavenger enzyme. This test can be accomplished by the fast technique on the smear test in which is deposed a drop from a solution 30% hydrogen peroxide, then is sampled a filler well loaded from the tested culture, on slant and is mixed in the drop of peroxide. The gas bubbles that appear immediately indicate the presence of catalysis. Is not indicated the sampling of the colonies from the agar medium of blood, because the erythrocytes own catalysis and falsify the reaction. It is recommended the utilization of an enterococcus stem and a stem of *Staphylococcus aureus* as negative and positive witnesses of the reaction, parallel with the tested stem.

The bacterial stems the isolated represent a panel of stems collected in the laboratory of bacteriology of the County Clinical Emergency Hospital, Oradea, coming from 172 patients admitted in the ward of surgery and dermato-venerology.

The period of the study is from 1.03.2015-30.09.2015

RESULTS

In the period 1.03.2015-30.09.2015 were taken for study 172 de patients from the wards of surgery and dermato-venerology of the County Clinical Emergency Hospital, Oradea. The biological samples analyzed were purulent secretions.

From the patients from the study, 115 biological samples with purulent secretions came from the surgery ward and only 57 samples from the dermatology ward.

From the total of 172 cases of purulent secretions, the most frequent isolated microorganism in the sampled cultures were *Staphylococcus aureus* 28(24,34%), followed by *Staphylococcus epidermidis* 24(20,86%), from the surgery ward.

A decrease was observed for the species *Saphylococcus saprophyticus*, 1 case (0,86%), followed by *Staphylococcus auricularis*, 2 cases (1,73%).

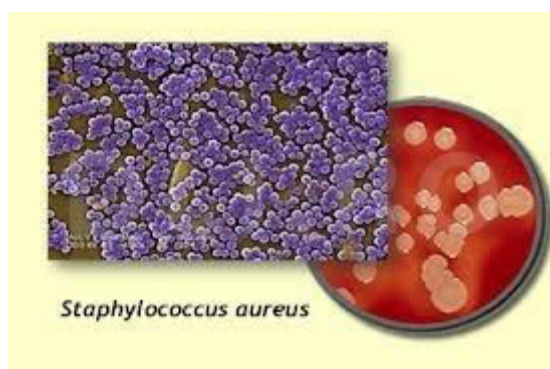


Fig .1. *Staphylococcus aureus*(www.bodygeec.ro)

Table no. 1

The staphylococci species identified and their percentage reported to the total number of cases, from the surgery ward

SURGERY			
No. CRT.	SPECIES	No. of cases	%
1.	<i>S. aureus</i>	28	24,34
2.	<i>S. haemolyticus</i>	17	14,78
3.	<i>S. saprophyticus</i>	1	0,86

4.	<i>S. auricularis</i>	2	1,73
5.	<i>S. epidermidis</i>	24	20,86
Total		115	66,86

Table no.2

The staphylococci species identified and their percentage reported to the total number of cases, from the dermatology ward.

No. CRT.	Dermato Venerology SPECIES	No. of cases	%
1.	<i>S. aureus</i>	26	22,60
2.	<i>S. haemolyticus</i>	9	7,82
3.	<i>S. saprophyticus</i>	1	0,86
4.	<i>S. auricularis</i>	2	1,73
5.	<i>S. epidermidis</i>	20	17,39
Total		57	49,56

Regarding the cases of dermatology, an increase incidence was observed in the case of the *Staphylococcus aureus* species, 26(22,60%), followed by the *Staphylococcus epidermidis* species, 20(17,39%). A decreased percentage is in the case of the *Staphylococcus saprophyticus* species 1(0,86%), followed by mg 2(1,73%). Thus the report between the *Staphylococcus aureus* species and the *Staphylococcus epidermidis* species, from the surgery and dermatology wards is of 1:1.

DISCUSSIONS

Staphylococci are developed easily in 24 hours, on simple nutritional mediums in aerobiosis.

Some rare versions of *Staphylococcus aureus* are developed only in the presence of CO₂ or of other metabolites.

The colonies of 24 hours have an aspect on solid medium, of S, are creamy, round and shiny.

The liquid mediums are homogenous affected, with granular deposit in the inferior part of the culture tube.

On agar with 5-8% defibrinated buck or ox blood, *Staphylococcus aureus* produces a circular area of hemolysis around the colony. The hemolysis of the *Staphylococcus aureus* determines the total hemolysis with the complete classification of the medium.

The presence of the carotenoid pigment, orange or citrus yellow, is a characteristic relatively constant of the stems of *Staphylococcus aureus*, but also of negative - coagulase *Staphylococci*.

On the direct smear from the clinical sample colored the gram *staphylococci* have an aspect of positive gram cocci or variable gram, isolated in pairs, in short chains or groups.

In the study performed, from the total of biological samples with purulent secretions, was underlined the increased incidence of the *Staphylococcus aureus* at both groups of patients, those coming from the surgery ward and those from the dermatology.

In a study performed by Gerard Lina, Yves Piémont, Florența Godail - Gamot, Michèle Bes, Marie - Odile Peter, Valérie Gauduchon, François Vandenesch, and Jerome Etienne, on 172 stems of *Staphylococcus aureus*, was discovered that were detected 55 % of the stems with *Staphylococcus aureus* in cellulites, 50 % of the stems in cutaneous abscess, 23 % of stems in osteomyelitis.

CONCLUSIONS

Considering the purposes of diagnosis of a laboratory of medical analysis, it is necessary that the preliminary identification to concern the prominence of an acceptable degree of probability of the species most frequently involved in the infectious pathology.

The study of cohort accomplished underlines the increased incidence of *Staphylococcus aureus* from the biological tests of the purulent secretions.

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