ANTIBIOTIC SENSITIVITY OF STAPHYLOCOCCUS AUREUS STRAINS IN THE CLINICAL HOSPITAL FOR INFECTIOUS DISEASES CONSTANTA

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ABSTRACT

Introduction: Staphylococcus are gram-positive bacteria that inhabit both the skin and mucous membranes of both humans and animals. Antimicrobial susceptibility testing is one of the most important laboratory procedures for infectious disease management.

Material and method: Between January 2017 and June 2019, in the Clinical Infectious Diseases Hospital (CIDH) of Constanta, 331 strains of staphylococcus isolated from various pathological products were identified and tested for antibiotic sensitivity: urine culture, stool culture, pharyngeal / nasal discharge, blood culture, sputum, vomiting fluid and various secretions.

Results: During 2017, 95 strains were isolated from patients hospitalized in CIDH, in 2018: 118, and in the first half of 2019: 124 staphylococcal strains.

An analysis by age groups shows that staphylococcus infection predominates in adults with a total of 196 (59.21%), and in children, less than 18 years: 135 (40.78%). Of the 196 adults, there are immunocompetent patients: 115 (58.67%), immunocompromised by HIV 40 (20.50%), and 19 were hospitalized in the intensive care unit (9.69%).

Regarding the predominant sex in staph infections, the most strains were registered in males: 179 (54.07%) and 152 in females (45.92%).

Out of the total strains of isolated Staphylococcus, 160 (48.33%) of Staphylococcus aureus were identified, of which methicillin resistant staphylococcus aureus (MRSA) 43 (26.87%).

Testing for Staphylococcus aureus strains with Oxacillin showed that 45 (28.12%) were resistant, Rifampicin 26 (16.25%) was resistant, Fluoroquinolones 29 (18.12%), and Cotrimoxazole / Sulfamethoxazole 27 (16.87%) of the strains were resistant.

Conclusions: There is a relatively high resistance to Oxacillin of Staphylococcus aureus strains and a relatively low resistance to fluoroquinolones, Rifampicin and Cotrimoxazole / Sulfamethoxazole, over the years studied.

Keywords: Staphylococcus aureus, sensitivity, resistance

Introduction:

Staphylococcus are gram-positive bacteria that inhabit both the skin and mucous membranes of both humans and animals. (1)

Antibiotic resistance is the natural / acquired ability of a microorganism to withstand the effects of one or more antibiotics. (2)

This may be the natural resistance that represents the intrinsic ability of some bacteria to resist certain antibiotics and the acquired resistance that is of great clinical and scientific importance. (2)
**Material and method:**

Between January 2017 and June 2019, in the Clinical Infectious Diseases Hospital of Constanța (CIDHC), 331 staphylococcal strains isolated from various pathological products were identified and tested for antibiotic sensitivity: urine culture 28 (8.45%), stool culture 35 (10.57%), pharyngeal discharge 17 (5.13%), blood culture 22 (6.64%), sputum 16 (4.83%), vomiting fluid 13 (3.92%) and various secretions 200 (60.42%).

Regarding the isolation of Staphylococcus aureus, it predominated in various purulent secretions (38.12%), ear secretions (17.5%), stool cultures (15.62%), blood cultures (13.75%) and eye secretions (9.37%). (Figure 1)

**Results**

During 2017, 95 strains were isolated from patients hospitalized in CIDHC, in 2018: 112 strains, and in the first 6 months of 2019: 124 strains. (Figure 2)

An analysis by age groups shows that staph infection predominates in adults with a total of 196 cases (59.21%) while in children less than 18 years about 135 (40.78%). The average age was 55 years, concluding that one of the reasons for the infection would be considered the gradual decrease of immunity with age. (Figure 3)

Of the 196 adults, there are 115 immunocompetent patients (58.67%), immunocompromised by HIV: 40 (20.50%), 19 (9.69%) were hospitalized in the intensive care unit, and in the day hospitalization department. were 22 (11.22%). (Figure 4)

Regarding the predominant sex in staphylococcal infections, the most cases were registered in males 179 (54.07%), and in females just 152 (45.92%). (Figure 5)
Of the total 160 isolated Staphylococcal strains (48.33%) were Staphylococcus aureus, of which 43 (26.87%) were Meticiline Resistant Staphylococcus Aureus (MRSA) strains. (Figure 6)

Testing for Staphylococcus aureus strains with Oxacillin showed that 45 (28.12%) were resistant, Rifampicin 26 (16.25%) was resistant, Fluoroquinolone 29 (18.12%) and Cotrimoxazole / sulfamethoxazole 27 (16.87%) resistant strains. (Figure 7)

Discussions

There are numerous studies in the literature on staphylococcal infections that show waves of antimicrobial resistance. (3)

In our study, we observed that Staphylococcus aureus maintained some sensitivity to rifampicin, fluoroquinolones, and cotrimoxazole / sulfamethoxazole for 2 and a half years, with increased resistance to Oxacillin. However, the percentage of MRSA in 160 isolated Staphylococcus aureus strains is lower than that reported in Romanian hospitals participating in the EARSS study (61% MRSA). In the study performed at the Brasov Emergency Hospital, on a number of 898 strains of Staphylococcus aureus isolated in a period of 8 months, the percentage of MRSA is 41.75%, and in our study it is found in a percentage of 26.87%. (3)

In another study performed on 125 strains belonging to the genus Staphylococcus, a number of 64 strains (51.20%) were isolated from male patients, and the rest, respectively 61 strains (48.80%) came from from women, observing a balance between men and women; and all staphylococcal strains studied were confirmed to be resistant to Oxacillin, which we observe in our study that there is an increasing percentage of Staphylococcus aureus resistance to Oxacillin and a higher number of staphylococcal strains among men 54.07%, than that of women, respectively 45.92%. (4)

The percentage of MRSA in the 160 strains of Staphylococcus aureus is 26.78%, representing a lower value than the percentage of MRSA reported on Romanian hospitals participating in the EARSS (> 43%), in 2018. (5)

Conclusions

The number of Staphylococcal strains has been increasing from one year to another, isolating most often in various purulent secretions.

Staphylococcus aureus strains have maintained a relatively constant sensitivity to Rifampicin, Fluoroquinolone and Cotrimoxazole / Sulfamethoxazole, over the time studied. The maintenance of the resistance of Staphylococcus aureus to Oxacillin during the studied period was
noted.

It requires a continuous and careful monitoring of germ resistance in our geographical area, as well as throughout the country. In order to decrease the resistance of Staphylococcus aureus to different antibiotics it is necessary to implement a program for rational use of antibiotics at the national and local level.

References

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