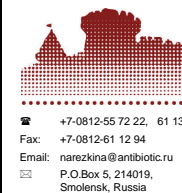


Prevalence of methicillin-resistant *Staphylococcus aureus* in different regions of Russia: results of multicenter study

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Revised Abstract

Objectives: Methicillin-resistant *Staphylococcus aureus* (MRSA) is one of the most important nosocomial pathogens. The spread of methicillin-resistant staphylococci has become an alarming problem throughout the world, but no data concerning the prevalence of MRSA in Russia have been published yet. The aim of this study was to determine the frequency and distribution of MRSA in different regions of Russia. **Methods:** A total of 879 clinical strains of *S. aureus* isolated in 2000-2001 from patients hospitalized in 17 hospitals in different parts of Russia - 4 in Central region (Moscow, Ryazan, Smolensk), 2 in North-West region (St.-Petersburg), 3 in South region (Krasnodar, Stavropol), 2 in Volga region (N. Novgorod, Kazan), 3 in Ural region (Ekaterinburg, Ufa), 3 in Siberian region (Krasnoyarsk, Novosibirsk, Tomsk), were included in the study. Antimicrobial susceptibility testing was performed by agar dilution method. The susceptibility testing and interpretation of the results were performed according to the NCCLS guidelines. *S. aureus* ATCC®29213 strain was used for quality control. **Results:** Among 879 *S. aureus* strains 295 (33,6%) have been found to be methicillin-resistant. The prevalence of MRSA varied significantly between different hospitals - from 0% to 89,5%. No association between geographical location of hospital and rates of resistance to methicillin was found. The highest rates of resistance to methicillin (36,6%-89,5%) were found in hospitals where patients with infected burns and orthopedic infections were predominant. No or much lower resistance rates to methicillin (0%-27,3%) were found in the general service hospitals and pediatric hospitals. The highest percentage of MRSA was observed in burn, orthopedic and intensive care units of all hospitals included in this survey. **Conclusions:** The prevalence of MRSA in hospitalized patients in Russia was found to be more dependent on the profile of clinical ward than on the geographical location of a hospital.

Introduction

MRSA is one of the major nosocomial pathogen since the moment of its first appearance till nowadays. Treatment of MRSA infections is one of the main problems of antimicrobial therapy in term of resistance of this pathogen to all β -lactams and to many other classes of antimicrobials. Such resistance leads to increase of mortality and to decrease in cost-effectiveness of treatment. There are no currently available data concerning the prevalence of MRSA in Russia. Lack of such knowledge led us to perform a study with the purpose to determine the frequency and distribution of MRSA in different regions of Russia.

METHODS

A total of 879 clinical strains of *S. aureus* isolated in 2000-2001 from patients hospitalized in 17 hospitals in distinct regions of Russia (Fig. 1) were included in the study. The strains were identified using cultural growth test on mannitol-salt agar and tube coagulase test. The susceptibility testing was performed by agar-dilution method using Mueller-Hinton agar (Becton Dickinson, USA) supplemented with oxacillin (Sigma, USA; in range from 0,06 to 256 μ g/ml) and 2% NaCl.



Figure 1. Geographical distribution of centers, participating in the study

Plates were inoculated with bacterial suspension using the multipoint inoculator (Mast Diagnostics Ltd, UK) and incubated at 35°C for 24 hours. Interpretation of results was performed in accordance with NCCLS recommendations. *S. aureus* strains with MIC of oxacillin ≥ 4 were reported as methicillin-resistant. *S. aureus* ATCC®29213 strain was used for quality control.

For the detection of statistical significance between the rates of MRSA in different units the exact Fisher test with adjustment for multiple comparisons was used.

Results And Discussion

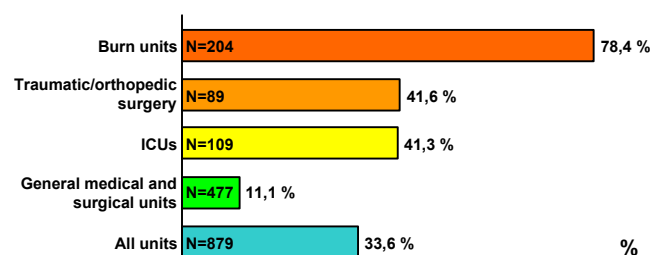


Figure 2. The rates of MRSA in different units

Among 879 *S. aureus* strains 295 (33,6%) have been found to be methicillin-resistant (Fig.2). The prevalence of MRSA varied significantly between different hospitals (0% to 89,5%). No association between geographical location of hospital and prevalence of MRSA was found. The rates of resistance to methicillin in general medical/surgical units, ICUs, traumatic/orthopedic surgery units and in burn units were 11,1%, 41,3%, 41,6%, and 78,4%, respectively. Thus, the rates of MRSA were found to be significantly higher in the ICUs, traumatic/orthopedic surgery units and in burn units, than in the general medical/surgical units and than the rates of resistance among all tested strains (in all cases p-values were < 0.0001)

CONCLUSIONS

- MRSA is a widespread nosocomial pathogen in Russia that accounts for up to 89,5% of all *S. aureus* infections in some hospitals.
- Prevalence of MRSA in Russia does not depend on the geographical location of the hospital, but depends on the profile of clinical ward and is highest in the ICUs, traumatic/orthopedic surgery units and, especially, in burn units.