Microbiological Contamination and Microbial Resistance in Riga and Nearby Hospitals

Angelika Krūmiņa [1, 2], ***Sniedze Laivacuma*** [1, 2], ***Marina Bogdanova*** [3], ***Svetlana Makarova*** [4], ***Ludmila Vīksna*** [1, 2], ***Indra Zeltiņa*** [1, 2]

[1] *Rīga Stradiņš University, Department of Infectology and Dermatology, Latvia*
[2] *Riga East University Hospital, Latvia*
[3] *Riga Stradiņš University, Latvia*
[4] *Institute of Food Safety, Animal Health and Environment "BIOR", Latvia*

Introduction. One of the most important problems in medical care is health-care associated infections (HCAI). About 10 % of all hospitalised patients are affected by HCAI that results in prolonged hospital stay, frequent complications and long-term disability, increased antimicrobial resistance and higher treatment costs.

Aim, Materials and Methods. The aim of this study was to analyse microbiological contamination of surfaces in different departments of various hospitals in Latvia.

180 samples from four Latvian hospitals were taken by wet wipe test for detection of *Staphylococcus spp.,* sulphite-reducing *Clostridia,* coliform and non-fermenting species of bacteria. Such selective agars were used as MALDI-TOF-MS for identification and E-test for detection of antimicrobial resistance. MS Excel and IBM SPSS v.21 were used for data analysis

Results. 24.5 % (44) of all 180 samples were positive for at least one of the mentioned bacteria. Ten different bacterial species were identified, but only three of them cause HCAI – *A. baumannii, P. aeruginosa* and *S. aureus.* Aforementioned species made 34 % of all bacteria found. The most common was *A. baumannii* (46.7 %), meanwhile *P. aeruginosa* was 33.3 % and *S. aureus* – 20 %.

53.3 % pathogens were found in the hospitals of Riga and 46.7 % in regional hospitals, but despite these results, an overall contamination in regional hospitals was higher because only 37.8 % of all Riga samples were contaminated, but only 23.5 % of them were HCAI. In regions 11.1 % of samples contained bacteria and HCAI were found in 70 % of them.

Antimicrobial resistance results show that all *S. aureus* were resistant to Penicillin, 66.6 % had a multidrug resistance to Penicillin, Erythromycin, Gentamicin and Levofloxacin. 28.6 % of *A. baumannii* were sensitive, but 71.4 % had resistance to Ceftazidime, Imipenem, Ciprofloxacin, Cefepime, Ceftriaxone and Piperacillin / Tazobactam. 20 % of *P. aeruginosa* were sensitive but 80 % had drug resistance to Piperacillin, Ceftazidime, Piperacillin / Tazobactam, Cefepime, Ciprofloxacin and Levofloxacin. There were no significant differences between antimicrobial resistance in Riga and regional hospitals.

Conclusions. An overall microbiological contamination was more common in Riga hospitals, but frequency of HCAI was larger in regions. Only 20 % of all bacteria were sensitive to antibiotics, 80 % had resistance to at least one drug. The study shows that there are medical problems with efficiency of sanitary and counter-epidemic regimen plan in some inpatient departments.