

Short Report

The role of mobile phones in the spread of bacteria associated with nosocomial infections

Oguz Karabay,¹ Esra Koçoglu,² and Mustafa Tahtaci.³

¹Department of Infectious Diseases and Clinical Microbiology, Faculty of Medicine, Abant Izzet Baysal University Izzet Baysal, Bolu 14280, Turkey;

²Department of Microbiology and Clinical Microbiology, Faculty of Medicine, Abant Izzet Baysal University Izzet Baysal, Bolu 14280, Turkey;

³Department of Internal Medicine, Faculty of Medicine, Abant Izzet Baysal University Izzet Baysal, Bolu 14280, Turkey.

Abstract

Background: We aimed to investigate bacterial contamination of the mobile phones of the healthcare personnel (HP) employed in a teaching hospital in Turkey.

Methodology: Samples were collected from the mobile phones of 122 HP, of whom 39 were physicians, 50 nurses, 22 residents, and 11 interns.

Results: Growth was observed in 111 out of 122 samples evaluated; however, bacteria that might be associated with hospital infection were isolated in only ten (9.0%) samples, four of which were *Escherichia coli*, two *Enterococcus faecalis* (Vancomycin-sensitive), two *Pseudomonas aeruginosa*, one *Pseudomonas fluorescens*, and one *Klebsiella pneumoniae*. Neither MRSA nor vancomycin-resistant Enterococci were isolated from mobile phones in our study.

Conclusions: Our study reveals that mobile phones of HP may get contaminated by bacteria (such as *Escherichia coli*, *Pseudomonas aeruginosa* and *Klebsiella pneumoniae*), which cause hospital infections, and may serve as a vehicle for the spread of nosocomial pathogens.

Key Words: mobile phones, hospital infections, bacterial contamination, healthcare personnel.

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Introduction

Nosocomial infections increase day by day and such infections cause a significant rate of mortality and morbidity. The aetiological agents of hospital infections may spread through the hands of healthcare personnel (HP), thermometers, stethoscopes, and even toys in the pediatric intensive care units of hospitals [1].

Today, mobile phones have become one of the indispensable accessories of professional and social life. The use of cell phones often occurs in hospital halls, laboratories, and/or intensive care units when dealing with severe illnesses. It is not clear whether such accessories have a role to play in the spread of bacteria and we identified only one small-scale study that was conducted to determine if the mobile phones of HP are the vehicles of bacterial-associated nosocomial infections [2]. Thus, in this study, we investigated bacterial contamination of the mobile phones of the

healthcare workers employed in a teaching hospital, with a bed capacity of 200 and one intensive care unit, located in the Western Black Sea Region of Turkey.

Materials and Methods

Samples were collected from the mobile phones of 122 HP, of whom 39 were physicians, 50 were nurses, 22 were residents and 11 were interns, over a two week period between January 10 and January 25, 2007.

The samples were collected aseptically using damp cotton swabs by rotating the swabs on the keys of the mobile phones and were at first inoculated into Brain Heart Infusion (BHI) (Merck, Germany) as a transport medium and incubated at 37°C for 24 hours aerobically. Further subcultures were made on 5% sheep blood agar (RTA, Turkey) and eosin methylene-blue agar (Merck, Germany) plates, and were incubated at 37°C for

24 to 48 hours aerobically. Plates were observed for growth and colonial morphology of the isolates. The isolates were Gram stained, and were further tested for the presence of catalase and oxidase enzymes. Gram-positive catalase-positive cocci were tested for mannitol utilization and coagulase development. Catalase negative gram positive cocci were tested using API Strep (Biomerieux, Marcy L'etoil, France) and Gram-negative bacilli were tested using API 32 E (Biomerieux, Marcy L'etoil, France), where applicable.

Results

Out of 122 samples evaluated, growth was observed in 111 samples. However, bacteria that might be associated with hospital infection were isolated in only ten (9.0%) samples, four of which were *Escherichia coli*, two were *Enterococcus faecalis* (Vancomycin-sensitive), two were *Pseudomonas aeruginosa*, one was *Pseudomonas fluorescens*, and one was *Klebsiella pneumoniae*. Methicillin-resistant *Staphylococcus aureus* (MRSA) is one of the most frequently isolated bacteria in hospital infections; however, neither MRSA nor vancomycin-resistant *Enterococci* were isolated from mobile phones in our study. Because methicillin-sensitive *Staphylococci* are usually the causative agents of community acquired infections and we did not assume these bacteria to be agents of hospital-acquired infections. Bacteria species isolated in this study are presented in Table 1.

Table 1. Bacterial agents isolated from the study.

Bacterial agents identified	Number isolated	%
Coagulase-negative <i>Staphylococci</i> (CNS)	76	68.4
<i>Bacillus</i> spp.	16	14.4
Methicillin-sensitive <i>Staphylococcus aureus</i>	9	8.1
<i>Escherichia coli</i>	4	3.6
<i>Enterococcus faecalis</i> (Vancomycin-sensitive)	2	1.8
<i>Pseudomonas aeruginosa</i>	2	1.8
<i>Pseudomonas fluorescens</i>	1	0.9
<i>Klebsiella pneumoniae</i>	1	0.9
Total	111	100

Discussion

Our study reveals that mobile phones may get contaminated by bacteria (such as *Escherichia coli*, *Pseudomonas aeruginosa* and *Klebsiella pneumoniae*), which cause hospital infections, and may serve as a vehicle for the spread of nosocomial pathogens. Since the same phones are used both outside and inside of hospitals, our results indicate that although only ten isolates were associated with nosocomial infections, these contaminated phones can play some role in the spread of hospital infection bacteria in the community. Today's mobile phones are important equipment for physicians. Since restrictions on the use of mobile phones by HP in hospitals is not a practical solution, we suggest that HP should practice increased adherence to infection control precautions such as hand hygiene. In addition, HP should be informed that these devices may be a source for transmission of hospital-acquired infections. Further studies for the possible methods of decontamination of mobile phones, such as using alcohol and/or disinfection tissues, should be conducted in hospitals with more intensive care units and larger bed capacities.

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Corresponding Author: Oguz Karabay, Abant Izzet Baysal Universitesi Izzet Baysal Tip Fakültesi Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji AD- Bolu 14280 Türkiye, Tel: +903742534656 Fax: +903742534615, e-mail: drkarabay@yahoo.com.

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