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Can an antibacterial coating on surfaces in an intensive care unit (ICU) prevent methicillin-resistant Staphylococcus aureus (MRSA) acquisition in patients?

Submission date
29/10/2018

Recruitment status
No longer recruiting

Registration date
19/11/2018

Overall study status
Completed

Last Edited
29/11/2022

Condition category
Infections and Infestations

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Methicillin-resistant Staphylococcus aureus (MRSA) can cause serious disease that can be difficult to treat because the bacteria cannot be killed by commonly used antibiotics. Patients can acquire MRSA while in hospital and can carry it into the community without showing signs of infection. Surfaces in hospital can be made to contain or can be treated with substances that kill bacteria continuously. This might be an effective way of controlling the spread of MRSA in hospitals. This study aims to investigate whether applying an antibacterial coating to surfaces in an intensice care unit (ICU) could reduce acquisition of MRSA and other disease-causing bacteria in the patients.

Who can participate?
All patients admitted to the medical ICU of Bundang Jesaeng Hospital during the study period were included, except patients aged under 18 years and patients in hospital for less than 72 hours.

What does the study involve?
For the first 5 months of the trial, patients were treated as usual except that the inside of their nostrils were swabbed within 48 hours of ICU admission and at discharge from hospital. A titanium dioxide coating was then applied to surfaces and walls in the ICU that were regularly touched by people. For the next 5 months, patients were again treated as usual except that the inside of their nostrils were swabbed within 48 hours of ICU admission and at discharge from hospital. The swabs were cultured in a laboratory to check for disease-causing bacteria, including MRSA.

What are the possible benefits and risks of participating?:
After the antibacterial coating had been applied, the participants might have a lower risk of acquiring disease-causing bacteria from the hospital environment. Otherwise, they were treated as normal, so there was no additional risk.

Where is the study run from?
The study was performed at Bundang Jesaeng Hospital, a 630-bed secondary care teaching hospital in Gyeonggi-do, South Korea.

When is the study starting and how long is it expected to run for?
January 2016 to December 2017

Who is funding the study?
Bundang Jesaeng Hospital

Who is the main contact?
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Type(s)
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Additional identifiers

Protocol serial number
N/A

Study information

Scientific Title
Environmental disinfection with a photocatalyst antimicrobial coating as an adjunctive measure to control transmission of methicillin-resistant Staphylococcus aureus (MRSA) in patients in intensive care units (ICU): a prospective cohort study in a high-incidence setting

Study objectives

We sought to evaluate the usefulness of a photocatalyst to reduce the risk of MRSA transmission, by comparing MRSA acquisition rate and nosocomial infection rate before and after photocatalyst coating.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Institutional Review Board of Bundang Jesaeng Hospital Health System Clinical Trials Center, 02/06/2016, Jesaeng Hospital - infection 16-01.
Since the study had minimal health risk and the study subjects were anonymized, the Institutional Review Board waived the requirement for written informed consent from the patients.

Study design
Observational cohort study

Primary study design
Observational

Study type(s)
Prevention

Health condition(s) or problem(s) studied
Methicillin-resistant Staphylococcus aureus (MRSA) infection

Interventions
A titanium dioxide-based photocatalyst was coated on high touch surfaces and walls. 5 months of pre-intervention data were compared with 5 months of post-intervention data. The incidence rates of multidrug-resistant organism acquisition and the rates of hospital-acquired blood stream infection, pneumonia, urinary tract infection, and Clostridium difficile–associated diseases were compared using Cox proportional hazards regression analysis.

Intervention Type
Other

Primary outcome(s)
MRSA acquisition assessed using culture results which were obtained from patients' nares up to 48 hours after ICU admission and on discharge from ICU.

Key secondary outcome(s))
1. Vancomycin-resistant Enterococcus spp. (VRE) acquisition assessed by reviewing culture results and medical records from admission until discharge from ICU
2. Multidrug-resistant Acinetobacter baumannii (MRAB) acquisition assessed by reviewing culture results and medical records from admission until discharge from ICU
3. Clostridium-difficile–associated disease (CDAD) acquisition assessed by reviewing culture results and medical records from admission until discharge from ICU
4. Hospital-acquired infections (HAI), including bloodstream infection, pneumonia, and urinary tract infection as defined by The Centers for Disease Control and Prevention, assessed by reviewing culture results and medical records from admission until discharge from ICU

Completion date
31/12/2017

Eligibility

Key inclusion criteria
1. Admitted to the medical intensive care unit during the study period.

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Sex
All

Total final enrolment
621

Key exclusion criteria
1. Aged <18 years
2. Hospitalized <72 hours

Date of first enrolment
01/09/2016

Date of final enrolment
31/07/2017

Locations

Countries of recruitment
Korea, South

Study participating centre
Bundang Jaeseng hospital
180-2 Seohyeon-ro
Bundang-gu
Seongnam-si
Gyeonggi-do
Seongnam
Korea, South
463-774

Sponsor information

Organisation
Bundang Jesaeng Hospital

ROR
https://ror.org/03z0bdc81

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
Bundang Jesaeng Hospital

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and analysed during the current study will be available upon request from Su Jin Jeong (JSJ@yuhs.ac.kr) immediately after publication of the results. All of the anonymised individual participant data collected during the trial will be available, along with the study protocol and statistical analysis. These data will be available to any applicant for any purpose for an indefinite period.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	03/12/2018		Yes	No
Basic results		04/01/2018	04/01/2019	No	No