Detection methods of multidrug-resistant bacteria used in Korea

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The Korea Centers for Disease Control and Prevention (KCDC) has designated six species of multidrug-resistant bacteria as healthcare-associated infectious bacterium, and a laboratory guideline had published for detection, screening, confirmation and reporting of these bacterial isolates. Most laboratories in Korea are inspected in accordance with these guidelines, and reported test results, and transported the corresponding strains to the KCDC. This guideline is not significantly different from the CLSI guideline. MRSAs are detected by routine antimicrobial susceptibility testing. Molecular test against *mecA* gene with MRSA is mostly performed for epidemiological studies. VISA/VRSA and VRE strains are screened by using BHA-vancomycin medium, and then conformed by vancomycin MIC test and VanA and VanB gene test. Other healthcare-associated infectious multidrug-resistant bacteria include carbapenemase-producing *Enterobacteriaceae*, carbapenemase-producing *Pseudomonas aeruginosa* and carbapenemase-producing *Acinetobacter baumannii*. This guideline provides screening and confirmatory tests for these Gram-negative bacteria and covers most CLSI standards. The method of genetic testing for these resistant bacteria has been suggested. Use of chromogenic media for all 6 species of multidrug-resistant bacteria as screening methods have been accepted in most laboratories in Korea.

Antimicrobial Resistance Monitoring Reports in Korea

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Antibiotics makes it possible to treat bacterial infections, but as a result of emerging antimicrobial resistant bacteria, the treatment of bacterial infections has become difficult. At present, the most important thing we need to do for antimicrobial resistant bacteria control is prevention of antimicrobial resistant bacteria spread instead of new antibiotics development. To control the antimicrobial resistant bacteria, KCDC (Korea Center for Disease Control) is conduct KARMS (Korean Antimicrobial Resistance Monitoring System) and report the antimicrobial resistant rate data annually after the publishing "KARMS 2009 annual report" in 2011. To prevent spreading of multidrug resistance organisms (MDROs) caused healthcare associated infections, KCDC designated VRSA/VISA, MRSA, VRE, CRE, MRAB, MRPA which are the indicators of hospital infection management as medical infection diseases. Based on the annual report of KARMS, we analyzed the changes in the antimicrobial resistance rate of healthcare associated infectious diseases from 2007 to 2014.

The resistant rate of oxacillin in *Staphylococcus aureus* has constanly been from 67% in 2007 to 70% in 2014. Vancomycin-resistant *Enterococcus faecalis* had been a low incidence at 1-2% during the survey period. But vancomycin-resistant *Enterococcus faecium* increased from 25% in 2007 to 36.5% in 2014. The resistant rate of penicillin G in *Streptococcus pneumoniae* was 27% in 2010 but reduced to 13% in 2014. Imipenem resistant *Enterobacteriaceae* was seriously increased from 0.1% in 2007 to 2% in 2014. The resistance to imipenem was increased from 23% to 33% in *Pseudomonas aeruginosa*, and rapidly increased from 27% to 80% in *Acinetobacter baumannii* between 2007 and 2014.

The antimicrobial resistant rate of MDROs has increased and the resistant rate of imipenem has been increasing rapidly. To control the spread of high-resistant bacteria, Korean government tries to make the various legal restrictions to emphasize the importance of infection control and the management of antibiotic use.

National surveillance of antimicrobial resistance in Japan

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To slow the emergence of antimicrobial resistance (AMR) and prevent its spread, it is important to: (1) increase public knowledge and understanding of AMR and use of antimicrobials, (2) understand the state of AMR emergence and prevalence, (3) enhance proper infection prevention and control, (4) ensure antimicrobial stewardship in order to reduce antimicrobial-resistance organisms, and (5) accelerate research for effective preventive, diagnostic, and therapeutic treatments for antimicrobial-resistant infections.

In 2000, the Ministry of Health, Labour and Welfare (MHLW) launched the Japan Nosocomial Infections Surveillance (JANIS) program to promote rapid detection and appropriate response to nosocomial infections, and has constantly analyzed and assessed the prevalence of AMR and other related matters at the Central Council on Control of Nosocomial Infections in MHLW. Participation in this project is voluntary but participation of medical institutions to JANIS has been increasing year by year, currently reaching 1,859 organizations as of January 2016. A surveillance report on the analysis of trends in AMR in each institution is provided to the participating medical institutions. Open Reports that indicate national trends in AMR are disclosed to the public.

In this symposium, I would like to introduce JANIS data, especially AMR in clinical isolates, for understanding national trends in AMR in Japan. Furthermore, I also indicate long term surveillance data of specific resistant bacteria implemented by local surveillance group called SBRK (Study of Bacterial Resistance, Kinki Region of Japan).

The Current status of laboratory methods for the detection of antimicrobial resistant bacteria in Japan

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In Japan, three manuals are mainly used for the resistant bacteria detection. It's CLSI M100 series, EUCAST and the Japan society for Clinical Microbiology (JSCM). Most laboratories in Japan are inspected in accordance with CLSI or JSCM. This symposium will introduce about JSCM. The JSCM is not significantly different from the CLSI guideline. The JSCM has described the six bacterial species group, and a laboratory guideline had published for detection, screening, confirmation and reporting of these bacterial isolates. For example, regarding Staphylococcus genus, four resistance mechanisms are described. One is methicillin resistance detection method, and four detection methods such as MIC or selection media are described. Besides that, it mentions β-lactamase production, Inducible Clindamycin resistant, and SCV. Other the detection of antimicrobial resistantbacteria are described about *Enterococcus* spp., *Streptococcus* spp., Enterobacteriaceae,Glucose non-fermentative Gram-negative organisms and *H. influenzae*. Among these resistant bacteria, Carbapenemase-Producing bacteria are also problematic in Japan. Therefore, the latest knowledge on the screening of CPE and the detection of carbapenemase-producing of *Acinetobacter* spp will be introduced.