



Trends in the incidence rate of device-associated infections in intensive care units after the establishment of the Korean Nosocomial Infections Surveillance System

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SUMMARY

Background: The effectiveness of continuous nationwide surveillance on healthcare-associated infections should be investigated in each country.

Aim: To assess the rate of device-associated infections (DAIs) in intensive care units (ICUs) since the establishment of the Korean Nosocomial Infections Surveillance System (KONIS).

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Methods: Nationwide data were obtained on the incidence rate of DAI in ICUs reported to KONIS by all participating hospitals. The three major DAIs were studied: ventilator-associated pneumonia (VAP), central line-associated bloodstream infection (CABSI), and catheter-associated urinary tract infection (CAUTI). The pooled and year-wise incidence rates (cases per 1000 device-days) of these DAIs were determined for the period 2006 and 2012. In addition, data from institutions that had participated in KONIS for at least three consecutive years were analysed separately.

Findings: The number of ICUs participating in KONIS gradually increased from 76 in 2006 to 162 in 2012. Between 2006 and 2012, the incidence rate per 1000 device-days for VAP decreased significantly from 3.48 to 1.64 ($F = 11$, $P < 0.01$), for CAUTI the rate decreased non-significantly from 1.85 to 1.26 ($F = 2.02$, $P = 0.07$), and for CABSI the rate also decreased non-significantly from 3.4 to 2.57 ($F = 1.73$, $P = 0.12$). In the 132 ICUs that had participated in KONIS for at least three consecutive years, the VAP rate significantly decreased from the first year to third year ($F = 20.57$, $P < 0.01$), but the rates of CAUTI ($F = 1.06$, $P = 0.35$) and CABSI ($F = 1.39$, $P = 0.25$) did not change significantly.

Conclusion: The decreased incidence rate of VAP in ICUs in Korea might be associated with the continuous prospective surveillance provided by KONIS.

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Introduction

Healthcare-associated infection (HCAI) is a major threat for patient safety and can result in prolonged hospital stays, long-term disability, additional health costs, and increased mortality.¹ To reduce HCAI, surveillance is an essential tool as it is the important first step in identifying problems and priorities in assuring patient safety. It has been shown that conducting continuous prospective nationwide surveillance has helped to decrease infection rates in western countries.^{2–4} However, the effectiveness of continuous nationwide surveillance on HCAIs should be investigated in each country.

The Korean Nosocomial Infections Surveillance System (KONIS) was established in 2006 by the Korea Center for Disease Control and Prevention (KCDC) and the Korean Society for Nosocomial Infection Control (KOSNIC) with an aim to improve infection control practices in intensive care units (ICUs) of hospitals.⁵ Participation of hospitals in the system is encouraged and is voluntary. The KONIS system is a nationwide network for prospective surveillance of nosocomial infections including device-associated infections (DAIs) such as catheter-associated urinary tract infections (CAUTIs), central line-associated bloodstream infections (CABSIs), and ventilator-associated pneumonia (VAP) in adult patients in ICUs of participating hospitals.^{5,6}

In the present study, we evaluated the impact of KONIS on DAI incidence by analysing the incidence rates of VAP, CAUTI, and CABSI in ICUs between 2006 and 2012.

Methods

KONIS system

Since 2006, KONIS has collected prospective surveillance data on DAIs using standardized protocols.⁵ Hospital participation in KONIS is voluntary and the results are handled confidentially. Participation for at least three months is mandatory for all ICUs. The definitions of urinary tract infection (UTI), bloodstream infection (BSI), pneumonia, and device utilization ratios are standardized and based on those of the

Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, and used by the US National Nosocomial Infection Surveillance (NNIS) system.⁷

Data collection

Annual data on DAI incidence rates in ICUs participating in KONIS were collected from July 2006 to June 2013. DAI incidence rate per 1000 device-days was calculated as the total number of DAIs divided by the total number of the specific device-days (days of indwelling urinary catheterization, central line use or ventilator treatment), and multiplied by 1000. The DAIs included CAUTI, CABSI, and VAP. The data reported in KONIS had been collected by infection control professionals and comprised all incident DAIs in patients who stayed in the ICU for ≥ 48 h, for the period from admission to ICU through discharge or death, and at 48 h follow-up after discharge from ICU.

The participating ICUs were classified according to the institutional characteristics as follows: location of the hospital (Seoul, metropolitan areas near Seoul, southern metropolitan areas), type of ICU [medical ICU (MICU) or surgical ICU (SICU)], type of hospital (university-affiliated hospital, major teaching hospital, or private hospital), and size of hospital (300–699 beds, 700–899 beds, or ≥ 900 beds). A major teaching hospital was defined as a hospital that is a major component of the teaching programme of a medical school and also plays a major role in the clinical clerkship programme. The DAI incidence rate for each of the above classes was determined.

Time trend of the incidences of DAIs

The year-wise and periodic changes in the individual and pooled DAI incidence rate were determined to assess the incidence trend. The association between the institutional characteristics and the year-wise change in the incidence was investigated. In addition, the data from ICUs that had participated in KONIS continuously for at least three years were analysed separately. The period of three years was chosen because almost no influence from surveillance data feedback

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