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FROM AROUND THE GLOBE

Surveillance of health care - associated infections in Hungary

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Cross infection; Infection control; Hungary

Introduction

Health care-associated infections (HCAI) have been an important and increasing public health, clinical and economical problem for decades. They cause serious morbidity and mortality in hospitals, prolonging hospital stay, increasing antibiotic usage and hospital costs.[1-5] Reduction of HCAI rates and of the spread of multi drug-resistant organisms (MDRO) is currently a main issue of patient safety, and constitutes one of the greatest challenges of modern medicine.[6,7] HCAI concern 5 to 10 percent of hospitalized patients, while in intensive care units rate of HCAI can be up 25% to 50%.[8-12]

Development of diagnostic and therapeutic procedures has lead to more susceptible and vulnerable patient population in hospitals, namely neonates, elderly and patients with impaired immunity. HCAI surveillance, as a main component of the infection control programs, has a relevant role in the prevention of HCAI infections, and thus contributes to improvement of patients' outcome. HCAI infection rates are considered as one of the most accurate indicators of the quality of patient care in the last two decades. Reliable data on HCAI infection rates can be obtained by performing active standardized HCAI surveillance.[13-14]

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In 2004, as a result of public health demand for improving quality of care, an ongoing national HCAI infections surveillance network was established in Hungary ("NNSR": Nemzeti Nosocomiális Surveillance Rendszer). NNSR is a secure web-based reporting system developed at the Department of Hospital Epidemiology of the National Centre for Epidemiology (NCE). The aims of NNSR were the creation of a national reference database for HCAI infections and to facilitate feedback of results so that participating hospitals can compare their rates with national aggregated data and use that as a benchmark to measure their own performance. NNSR is a standardized system based on Centres for Disease Control and Prevention (CDC), National HCAI Infection Surveillance System (NNIS) and National Healthcare Safety Network NHSN definitions and methodology.[15-19] It has the following components: surgical site infection (SSI), adult and neonatal intensive care unit (ICU) device associated infections, hospital-wide bloodstream infections, hospital-wide infections caused by MDROs and HCAI outbreak reports.

The NNSR is a standardised, web-based reporting system. CDC definitions and methodology were translated into Hungarian and made available on our website (www.oek.hu). Software was offered free for participating hospitals. Training on case definitions, surveillance methodology, case finding and on software use has been provided by NCE on a regular basis. Data entry has been performed at hospital level and automatically sent to NCE. Participation in the surveillance modules is required for minimum 6 month, while reports of BSIs, MDROs as well as outbreak report are ongoing. Analyses and feedback of national data were provided yearly by NCE and aggregated data are published on NCE website. We present data of surgical site infection surveillance and ICU device associated surveillance between 2005 and 2009. Statistical analyses were performed with SAS 9.1 statistical package and a p value of ≤ 0.05 was considered significant.

Surgical site infection surveillance

Hospitals could choose SSI surveillance of one or more surgical procedures within the NNIS surgical categories. Active prospective surveillance was required from the time of the surgery until discharge. Minimum participation period is 6 month. For each patient in the procedure selected for SSI surveillance, the following data had to be completed: age, gender, ASA risk category, date of admission, operation and discharge, wound class, duration of operation, whether the surgery was elective or urgent, whether the operation was performed laparoscopically, antibiotic prophylaxis, reoperation and death. If an SSI occurred, the required details relating to it were: the date of infection, the type of infection (superficial, deep, organ/space) and the isolated microorganism.

From January 2005 to December 2009, 68 hospitals participated in NNSR, 21 surgical procedures were chosen with total numbers of 40238 operations and 915 SSIs records. The most often chosen surgical procedures and codes were: cholecystectomy (CHOL), herniorraphy (HER), hip (HPRO) and knee prosthesis (KPRO), mastectomy (MAST), colon surgery (COLO), caesarean section (CSEC) and appendectomy (APPY). Table I shows number of interventions, aggregated cumulative incidences (crude percentage of surgical intervention resulting in a SSI) and confidence interval by surgical procedure between 2005 and 2009. The percentage of SSI varied according to the type of surgical operation. Yearly SSI cumulative incidences by surgical procedure and trends were determined. The trend analysis of the SSI cumulative incidence showed a significant decreasing trend ($p<0.05$) for hip and knee prosthesis interventions, as shown in figure 1. SSI yearly incidences for the other surgical procedures were variable with no clear trend.

Intensive care unit device-associated infection surveillance

Data were gathered according to CDC NNIS and NHSN definitions and methodology on central line-associated bloodstream infections (CLABSI), ventilator associated pneumonia (VAP) and catheter associated urinary tract infections (CAUTI). Infections were recorded by day of onset. Similar to the SSI surveillance the minimum required participation period is 6 month. Presence of devices (central line, ventilator or urinary catheter) days and total number of patients in ICU were daily recorded. Outcomes measured monthly and at the end of the 6 month period were: CLABSI rate (number of CLABSIs per 1,000 central line days), VAP rate (number of VAPs per 1,000 mechanical-

Table I. Aggregated cumulative incidences between 2005 - 2009 by category of surgical intervention

Surgical intervention code	Operations	Hospitals	SSI	Cumulative incidence	95 % confidence interval
	Number				
CHOL	8834	25	107	1,21	0,78-2,31
CSEC	12335	26	180	1,45	1,01-2,98
HPRO	3756	13	93	2,47	1,31-3,45
HER	4997	19	95	1,90	1,11-2,92
COLO	1433	14	124	8,65	4,01-9,11
MAST	1212	8	25	2,06	0,89-2,78
KPRO	470	9	10	2,12	0,96-4,87
APPY	968	9	46	4,75	3,08-7,02

Cumulative incidence or rate of SSI by operative procedure is the number of SSIs/number of operations x 100
CHOL: cholecystectomy; **CSEC:** caesarean section; **HPRO**: hip prosthesis; **HER**: herniorraphy; **COLO**: colon surgery; **MAST**: mastectomy; **KPRO**: knee prosthesis; **APPY** appendectomy

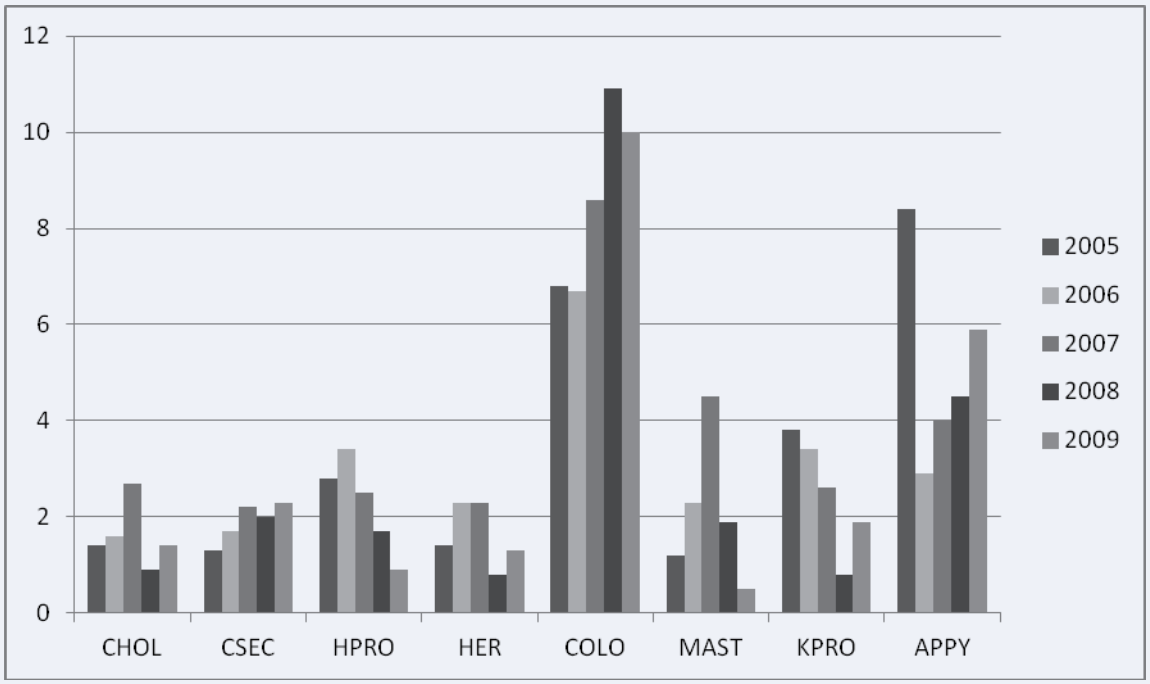
ventilator days) and CAUTI (number of CAUTIs per 1.000 urinary catheter days). Device days are the total number of days of exposure to the device for all of the patients in the ICU during the surveillance period. We determined yearly median rate of CLABSI, VAP and CAUTI and trends between 2005 and 2009.

Between 2005 and 2009 the yearly numbers of participating hospitals in ICU device associated infection surveillance were: 39, 26, 30, 34 and 33. The majority of ICUs (68%) were mixed (medical/surgical). We determined yearly median device associated rates and trends as shown in figure 2. There was a continuous downward trend in the yearly median rates of CLABSI rates between 2005 and 2009. In 2005 the CLABSI rate was 5/1000 central line days while in 2009 the CLABSI rate was 2.1/1000 central line days and this reduction proved to be significant. VAP rates varied between 13.8/1000 ventilator days in 2005 and 11.3/1000 ventilator days in 2009 with a peak of 16.4/1000 ventilator days in 2007 and no significant trend was observed in the studied period. Rates of CAUTI were 3.6/1000 urinary catheter days in 2005 and 3.3/1000 urinary catheter days in 2009 with no clear trend.

Conclusions and discussion

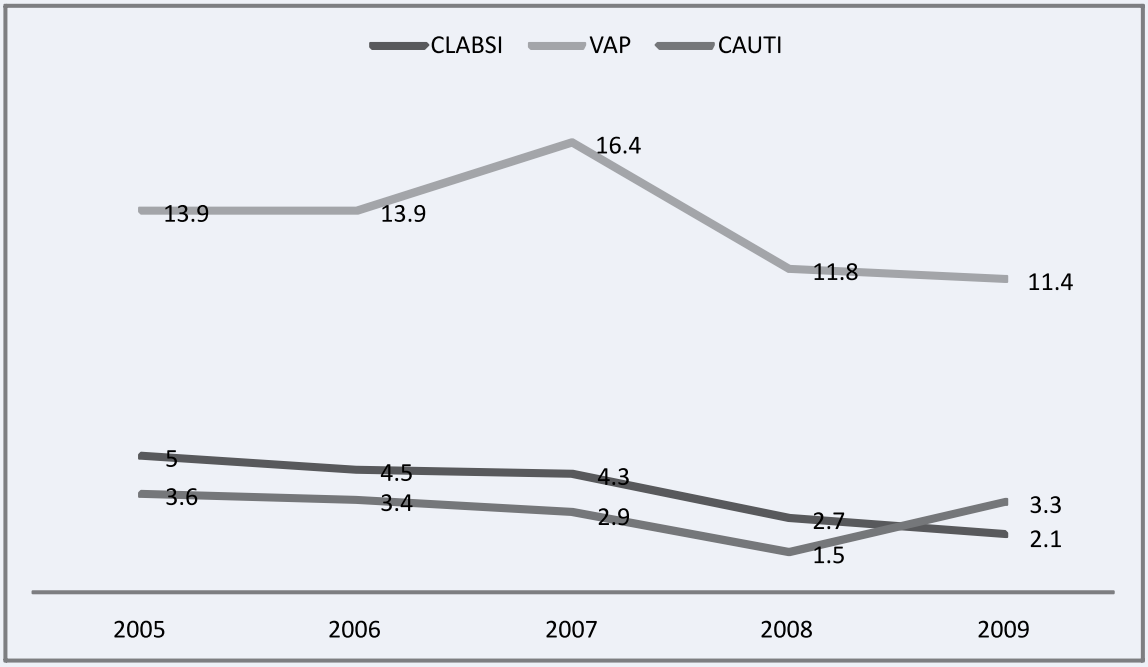
The establishment of the national HCAI surveillance system in Hungary and the ongoing education and feedback of results for the participating hospitals increased the interest and awareness towards HCAI and contributed to strengthen infection prevention and control in Hungary. For SSI surveillance participating hospitals were asked to assess their compliance with the available domestic guidelines on prevention of SSI, and for ICU device-associated infection surveillance participating hospitals were asked to measure their compliance with guidelines on prevention of CLABSI, VAP and UTI. Identified gaps have been used to improve practice and initiated the necessary interventions in order to increase compliance with preventive guidelines. Information provided by the surveillance data was used for action and to direct local infection control programs.

Similar to previous publications our national surveillance systems has proved to be effective in reduction of the yearly aggregated infection rates within five years, at least in two surgical procedures: HPRO and KPRO and in CLABSI in ICUs.[20,21] These reductions in infection rates were observed also in the individual participating hospitals. However there is still a lot of room for improvement and need for further efforts in development of infection prevention



Cumulative incidence or rate of SSI by operative procedure is the number of SSIs/number of operations x 100
CHOL: cholecystectomy; **CSEC:** caesarean section; **HPRO**: hip prosthesis; **HER**: herniorraphy; **COLO**: colon surgery; **MAST**: mastectomy; **KPRO**: knee prosthesis; **APPY** appendectomy

Figure 1. Trends in yearly cumulative incidence of surgical site infections by category of surgical intervention



CLABSI rate: number of CLABSIs per 1,000 central line days
VAP rate: number of VAPs per 1,000 mechanical-ventilator days
CAUTI: number of CAUTIs per 1.000 urinary catheter days

Figure 2. Device associated infection rates between 2005 and 2009

and control in Hungary as preliminary results of compliance with SSI, CLABSI and VAP bundles as well as hand hygiene compliance are low.

Even so we consider our national HCAI infection surveillance system to be of value as number of participating hospitals is increasing, there is a definite need for benchmarking and reduction of infection rates together with increasing compliance to the best infection control practice is becoming a priority in all our participating hospitals.

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