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Burden of healthcare-associated infections in China: results of the 2015 point prevalence survey in Dong Guan City

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SUMMARY

Background: Healthcare-associated infections (HCAIs) are a major health threat. There are few data about HCAI and antibiotic use in the People's Republic of China in the English literature.

Aim: To describe and discuss the prevalence of HCAI and antibiotic use from the 2015 point prevalence survey (PPS) in Dong Guan City.

Methods: In 2015, the Dong Guan (City) Nosocomial Infection Control and Quality Improvement Centre organized its yearly PPS in the secondary and tertiary care hospitals of Dong Guan City. The survey was performed on one single calendar day.

Findings: Thirty-seven secondary and 14 tertiary care hospitals assessed 9679 and 11,641 patients, respectively. A total of 616 patients had 681 HCAIs. The pooled HCAI prevalence (95% confidence interval) in secondary care, tertiary care, and all hospitals together was 2.3% (2.0–2.6), 3.4% (3.0–3.7), and 2.9% (2.6–3.1), respectively. Lower respiratory tract infection (LRTI), urinary tract infection (UTI), surgical site infection (SSI), and bloodstream infection together accounted for 73.1% of HCAIs. LRTI was the most frequently diagnosed HCAI (35.5%), followed by UTI (17.0%), and SSI (15.1%). Gram-negative bacteria were most frequently isolated (68.1%), followed by Gram-positive bacteria (19.3%), and fungi (10.9%). *Escherichia coli* was the most frequent pathogen (14.8%), and *Acinetobacter baumannii* accounted for 10.9%. A total of 34.8% of the patients received one or more antimicrobials.

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Conclusion: The pooled prevalence is in the range of other recent Chinese studies, but lower compared to previous reports in Europe, and the USA. The use of antimicrobials for therapeutic purposes is similar to that in Europe, but lower than previous Chinese reports, and lower than in the USA.

Introduction

Healthcare-associated infections (HCAIs) are a major health threat worldwide, causing morbidity and mortality and prolonging length of stay (LOS).[1–6] HCAI surveillance is effective for both estimating the burden and prioritizing strategies for the prevention of HCAI. Prospective surveillance is challenging and resource demanding. On the other hand, prevalence surveys require fewer resources, can be conducted hospital-wide, and address all different types of HCAI. National and regional point prevalence surveys (PPSs) have been performed for many years, mostly using the point prevalence methodology. A PPS is not suitable for measuring HCAI change over time unless it involves a large number of patients, but always provides a useful in-depth snapshot of the burden of HCAI and the distribution of HCAI types.[7,8] Large national and multi-national surveys have been performed recently in the USA and in Europe.[9,10] Local, regional and national surveys were also organized in the People's Republic of China,[11-14] but only a few have been reported in peer-reviewed journals and in the English language.[4–6,15–17] Most PPSs were performed on a non-specified sample of hospitals offering little detail.

The interpretation of rates or ratios of HCAIs in China is challenging because regions and cities are different and little information is given about aspects such as socio-economy or the gross domestic product (GDP). Dong Guan City has a population of 8.2 million and is located in Southern China. With a GDP per capita of US$8,546 in 2012, Dong Guan City is an upper-middle-income area according to the World Bank. It was the 22nd largest GDP (about US$93.3 billion) in China in 2015. In 2016, the allocated total budget for healthcare was US$57.3 million.[18] In 2010, the numbers of doctors, registered nurses, and acute care beds were 1.7 per 1000, 2.0 per 1000, and 3.1 per 1000 population, respectively.[19]

Since 2014, Dong Guan (City) Nosocomial Infection Control and Quality Improvement Centre (DNICC) organizes yearly PPS in all secondary and tertiary care hospitals of the city. The objectives of this report are to describe and discuss the results of the HCAI and antibiotic use data from the 2015 PPS in Dong Guan City.

Methods

Settings

All 37 secondary and 18 tertiary care hospitals of Dong Guan City took part in the PPS. Most hospitals had a mix of different clinical specialties (departments): internal medicine (including respiratory diseases, gastrointestinal diseases, cardiology, endocrinology, nephrology, haematology, oncology, and neurology), surgery (including general surgery, cardiac surgery, vascular surgery, neurosurgery, orthopaedics, urology, plastic surgery, and burn units), gynaecology and obstetrics, ear–nose–throat (ENT) diseases, paediatrics, neonatology, adult intensive care, and other departments (including traditional Chinese medicine, psychiatry, occupational health).

Study design

The PPS was organized by the DNICC. One week before the survey, preparation workshops were organized for local infection prevention and control (IPC) professionals on how to use the protocol and collect data. Professionals organizing the survey were required to have a minimum of two years' experience in IPC. The survey was performed on one single calendar day for all 51 hospitals. A maximum of 50 patients were allocated to each investigator. The PPS protocol followed the Chinese standard for nosocomial infection surveillance.[20] All patients present in the hospital at 00:01 on the day of survey were included in the PPS. HCAI case definitions were based on the definition criteria established by the ministry of health of the People's Republic of China.[4,6,21] The document is a modified translation of the US Centers for Disease Control and Prevention definitions for HCAI (Supplementary Table I).[22] Infants aged <12 months were included in the overall population, except for cardiovascular and central nervous system infections.[4,6] HCAIs were categorized into upper respiratory tract infection (URTI), lower respiratory tract infection (LRTI), urinary tract infection (UTI), gastrointestinal tract infection (GI), intra-abdominal infection (IA), surgical site infection (SSI), skin and soft tissue infection (SST), bloodstream Infection (BSI), and other infections (OTH). An infection was defined as HCAI if diagnosed >48 h after admission and meeting the specific clinical HCAI criteria. In addition, antimicrobial use was documented for the survey day.

Data collection

All patient data were collected on standardized case-related forms, which were provided by the DNICC. The hospitals submitted summary data by department to the DNICC and to the National Healthcare-Associated Infection Surveillance System (NHAISS).[12]

This survey was part of a mandated quality improvement initiative and did not require ethical approval.

Results

Together, 37 secondary and 14 tertiary care hospitals assessed a total of 9679 and 11,641 patients in 205 and 108 departments, respectively. A large proportion of patients were hospitalized in surgery (8105, 38.0%), followed by internal medicine (5924, 27.8%), gynaecology and obstetrics (2714, 12.7%), other departments (1742, 8.2%), paediatrics (1594, 7.5%), ENT (535, 2.5%), neonatology (485, 2.3%), and adult