CPSP
CANADIAN PAEDIATRIC SURVEILLANCE PROGRAM

Methicillin-resistant *Staphylococcus aureus* in hospitalized children

PROTOCOLS

Principal investigator

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Background

MRSA infections include hospital-associated methicillin-resistant *Staphylococcus aureus* (HA-MRSA) and community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infections. Compared to HA-MRSA, CA-MRSA is primarily acquired in the community setting and affects healthy ambulatory children and adults, causing skin and soft tissue infections, as well as severe disease and death, particularly necrotizing pneumonia, fasciitis, osteomyelitis and sepsis. This organism is ideally suited to disseminate particularly in schools, child care and other recreational sports settings.

The majority of CA-MRSA infections are caused by two or three clones that are distinct in their susceptibility to antimicrobials and genetic pattern from HA-MRSA. In many areas of the United States, these clones of CA-MRSA occur in 40% to 76% of hospitalized children with *Staphylococcus aureus* infections, lending support to the claims of 'epidemics of MRSA'. In the US, where the 'epidemic' is more entrenched, most children (over 70%) have no risk factors for infections.

Community non-invasive infections are reported anecdotally throughout Canada but the burden in children is not specifically known. Pockets of CA-MRSA have been reported since the late 1980s amongst Aboriginal populations and in youth with risk factors such as drug use and incarceration. Large metropolitan areas are experiencing emergence of CA-MRSA infections. In southern Ontario, there have been fatal paediatric infections and outbreaks affecting healthy newborns.

In 2006, the Canadian Nosocomial Infection Surveillance Program (CNISP) determined that 15% of the patients admitted to hospital with MRSA had CA-MRSA. We have limited information about the extent of disease, as CA-MRSA is reportable in one territory but is not in any province. Ultimately, the CPSP timely data has the potential to inform prevention, control and management strategies.

Methods

Currently, surveillance of HA-MRSA is performed in 50 hospitals (covering over 90% of major Canadian teaching hospitals) but only a limited number of community hospitals report through the CNISP. Through the established methodology of the CPSP, over 2,500 paediatricians and paediatric subspecialists will be actively surveyed monthly for identified cases of MRSA. The study will collect non-nominal detailed case-specific data that will document risk factors and clinical spectrum of severe MRSA infections in children hospitalized in Canada. Cases will be classified as community-acquired, transferred from another facility or acquired during a hospital admission. Cases where the culture was performed for colonization purposes, or if it were an incidental finding, would not be included.

Objectives

- To determine the annual number and proportion of children requiring hospitalization due to newly diagnosed MRSA infections across Canada.
- To describe the clinical spectrum of severe MRSA infections in children hospitalized in Canada.
- To identify potential risk factors for MRSA infections requiring hospitalization in Canadian children.

Case definition

Report all hospitalized children less than 18 years of age who have symptomatic MRSA infection, laboratory-confirmed from a clinical sample.

Exclusion criteria

MRSA from a surveillance culture or as an incidental finding on culture.

Duration

September 2008 to August 2010

Expected number of cases

Invasive MRSA disease accounts for only 7% of all MRSA in the United States. The estimated incidence for this study is 55 to 289 cases per year.

Ethical approval

Research Ethics Board, Children's Hospital of Eastern Ontario
Health Canada's Research Ethics Board

Analysis and publication

An annual interim analysis of the collected data will be done. Dissemination of completed study results will be submitted to paediatric, medical and/or infectious disease journals, and presented at national meetings. Study findings will be used for public health actions to reduce the spread of MRSA in Canada.