

P0655

Paper Poster Session III

MRSA - still there and threatening

Characterization of imported methicillin-resistant *Staphylococcus aureus* cases in Denmark, 2007-13

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Objectives

Since 2007, the annual numbers of new MRSA cases in Denmark have increased dramatically with the largest increase among community associated (CA)–MRSA. A steady increase in imported cases has also been observed and it is hypothesized that the imported cases are an important source for subsequent community spread. The objective of this study was to characterize imported MRSA cases in Denmark from 2007 to 2013 using molecular typing and epidemiological data.

Methods

In the period 2007-2013, all new MRSA cases were submitted to the Staphylococcus Reference Laboratory for molecular characterization as part of the National surveillance of methicillin resistant *S. aureus* (MRSA). The characterization included *spa* typing and annotation to clonal clusters (CC), antimicrobial susceptibility testing and presence of the PVL encoding gene *lukF-pv*. MRSA cases were classified into the epidemiological categories: Imported (IMP), Hospital acquired (HA), Community-onset but with a healthcare association (HACO) or Community-acquired (CA), based on clinical information obtained from structured questionnaires submitted by the general practitioners or hospital doctors. Furthermore, information about travel activities regarding proposed origin of the MRSA was subtracted from the questionnaires. Statistics: Trend analysis was performed for the total number of MRSA and imported cases.

Results

A total number of 8,375 new MRSA cases were identified from 2007-13 of which 1,601 were classified as imported cases. The annual number of new MRSA cases increased three-fold from 663 to 2,097 ($r^2=0.8146$) and imported cases proportionally from 114 to 368 ($r^2=0.9654$) in the study period. The imported cases belonged to 303 different *spa* types of which 166 *spa* types including 1,169 (73.0%) isolates could be assigned to six major CC groups: CC8 (N=309); CC5 (N=263); CC30 (N=261); CC22 (N=160); CC1 (N=176) and CC80 (N=80). Among the imported isolates 47.2 % were PVL positive and belonged to often recognized CA-MRSA clones, e.g. a high prevalence (N=162) of CC30: t019, PVL+ (Southwest Pacific Clone) was recognized. Correlations between specific clones and country/area of import was noted :CC30:t019, PVL+ with 115/162 cases reporting contact to Thailand/Philippines, CC8:t008, PVL+ (USA300) with 33/129 cases reporting contact to USA and CC1:t345/t657, PVL+ (Bengal Bay MRSA) with 43/55 cases reporting contact to India/Pakistan/Sri Lanka/Nepal/Afghanistan and 32/80 CC80, PVL+ cases having contact to Lebanon//Egypt/Greece/Iraq and an additional group of eight isolates from Romania.

Conclusions

Denmark experienced an increasing number of imported MRSA cases in the study period. The imported MRSA strains mostly belonged to typically community related MRSA clones and could often be related to country/areas where these clones are known to be endemic. The results indicate that travelers with no hospital contact abroad may become an increasing risk for MRSA introductions.