Correspondence between Guidelines for Antibiotic Treatment and Microbiological Outcome – Analysis of Cases of Pneumonia in the Swedish Intensive Care Registry

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Abstract and Objective

To treat severe pneumonia needing intensive care you must have guidelines for what antibiotic to use based on knowledge of local antibiograms. The objective of this study was to compare national guidelines for pneumonia with antibiograms from ICU patients with pneumonia. Data from the Swedish national registry of intensive care have been used to set up a model for this comparison. Primary diagnosis of pneumonia was divided in two groups – hospital and community acquired respectively – by route of admission. In community acquired pneumonia we found a failure rate of 6 and 10 % for the two recommended treatment regimes respectively according to antibiogram. In hospital acquired pneumonia the rate of failure was 3 and 5 %. Since patterns of antibiotic resistance change over time it is very important to update guidelines on a regular basis. This method contributes to do such updates based on clinical outcome. To improve this method further there is a need for standardized terminologies and information models for semantic interoperability between clinical and laboratory information systems.

Keywords:

Practice guidelines, Evidence-based practice, Quality of health care, Data interpretation, Information systems, Semantic interoperability

Methods

Intensive care data was prospectively collected by nurses and doctors at intensive care units (ICUs). This data was then electronically transferred to the Swedish national registry of intensive care. Corresponding microbiological findings were collected directly from the microbiological laboratory databases.
Patients in ICU with primary diagnosis of pneumonia were divided into two groups (community acquired and hospital acquired) by route of admission. National guidelines for treatment of severe pneumonia were compared with the actual antibiograms (incl species and susceptibility) from cultures from blood or airways within the first 48 hours of intensive care.

Results

Microbiological findings

271 ICU admissions following the inclusion criteria were found with positive cultures. Among cultures from blood or airways 118 were considered pathogenic. The most common bacteria from patients with hospital acquired pneumonia were: Streptococcus pneumonia (23), Staphylococcus aureus (11). Corresponding results from patients with community acquired pneumonia were: Streptococcus pneumonia (31), Staphylococcus aureus (9).

Guidelines findings

In guidelines for hospital acquired pneumonia there are two treatment regimes recommended. Here the rate of failure according to antibiogram would have been 5 and 3 % respectively. In the community acquired pneumonia group the failure rate would have been 6 and 10 %. In both groups there were cases not tested directly for the antibiotics recommended in the guidelines (44 % and 12 % respectively)

Conclusion and discussion

Since severe pneumonia has to be initially treated empirically it is very important to keep guidelines up to date. This method contributes to do so.

To be able to make this kind of analysis automated there is a need for standardized terms regarding this area of health care. The number of "not tested" antibiotics could be reduced by the use of synonym substances combined with microbiological knowledge of how certain bacteria respond to certain antibiotics.