Detection of Polysaccharides and Polysaccharide Antibodies in Pneumococcal Pneumonia

av

Simon Athlin

Akademisk avhandling

Avhandling för medicine doktorsexamen i Medicinsk vetenskap,
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Opponent: Professor Kristian Riesbeck
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**ABSTRACT**


Increased efforts are encouraged to develop and evaluate rapid diagnostic tests and to study the immune response in pneumococcal community-acquired pneumonia (CAP). A new urinary antigen test for detection of cell-wall polysaccharides, the Uni-Gold™ *Streptococcus pneumoniae* test, was evaluated on consecutive urine samples and urine samples from adult bacteremic patients. The test was slightly more sensitive than the BinaxNOW® *S. pneumoniae* urine antigen test, but with more false-positive results in patients with *E. coli* and α-hemolytic streptococci in blood. Then, the BinaxNOW® test was evaluated on nasopharyngeal (NP) aspirates (NPA) to diagnose pneumococcal etiology in adult CAP. The test showed a high sensitivity with few false-positive results in atypical pneumonia and controls. A positive test result correlated with clinical cure with β-lactam monotherapy. This method may be useful in adult CAP populations with low pneumococcal colonization rates in NP.

We studied the association between a high NP colonization density and patient factors in adult CAP. Serotype-specific antibodies against capsular polysaccharides (Ig) in serum were measured. A medium/high Ig level at admission correlated to a high density, indicating that a significant load is necessary to cause pneumonia due to protective serum Ig. Finally, we measured the Ig titres at admission and after 4 weeks in adult pneumococcal CAP. High Ig titer ratios were associated with infecting serotypes with thin capsules and medium/high invasive potentials. Low Ig titer ratios were associated with serotypes with thick capsules and were observed in patients with a high pneumococcal load in the bloodstream.

In conclusion, rapid tests for polysaccharides are useful in detection of pneumococcal etiology in CAP and polysaccharide Ig in serum may contribute to protection against pneumococcal CAP.

*Keywords: Streptococcus pneumoniae, pneumococcus, pneumonia, cell-wall polysaccharide, capsular polysaccharide, antibody urinary antigen, nasopharyngeal aspirate, antibody, immunoglobulin, adult.*

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