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Short communication

A promising new test to detect *Streptococcus pneumoniae* urinary antigen

Un nouveau test prometteur pour la détection de l'antigénurie Streptococcus pneumoniae

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Abstract

Background. – *Streptococcus pneumoniae* is the main etiology of community-acquired pneumonia (CAP). A quick detection of urinary antigen helps in obtaining a documented result in case of *Streptococcus pneumoniae* CAP.

Methods. – We compared the BinaxNOW® *S. pneumoniae* test with the new urinary antigen Sofia® *S. pneumoniae* FIA. We examined 133 urine samples.

Results. – Of the 133 included and tested non-concentrated urine samples, BinaxNOW® and Sofia® tests yielded 122 and 113 negative results and 11 and 20 positive results, respectively. The overall agreement between the tests was good.

Conclusion. – This new test enabled the diagnosis of seven additional cases (7/133 = 5.2%). The improved detection with Sofia® may be due to the immunofluorescence method used by this new test as compared with the colorimetric method used by BinaxNOW®. Sofia® also offers the advantage of being connected to the laboratory information system (LIS) allowing an automated traceability.

Keywords: BinaxNOW®; Sofia®; *Streptococcus pneumoniae*

Résumé

Introduction. – *Streptococcus pneumoniae* est la principale bactérie en cause dans les pneumonies communautaires. Des tests rapides immuno-enzymatiques détectant l'antigène de *S. pneumoniae* dans les urines facilitent le diagnostic étiologique de ces pneumonies.

Méthodes. – Nous avons comparé le nouveau test Sofia® *S. pneumoniae* FIA avec le test le plus ancien et le plus fréquemment utilisé : BinaxNOW® *S. pneumoniae*.

Résultats. – Parmi les 133 échantillons, le test BinaxNOW® et le test Sofia® sont négatifs dans 122 et 113 cas, et positifs dans 11 et 20 cas, respectivement. Le coefficient de concordance est bon.

Conclusion. – Ce nouveau test a permis de diagnostiquer sept cas supplémentaires (7/133 = 5,2 %). Le test Sofia® utilise une nouvelle technologie basée sur l'immunofluorescence à la différence du test colorimétrique BinaxNOW®, expliquant probablement les meilleurs résultats du test Sofia®. Enfin, le test Sofia® est connectable au système informatique, permettant une traçabilité automatisée pour l'accréditation.

Mots clés : BinaxNOW® ; *Streptococcus pneumoniae* ; Sofia®

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1. Introduction

Streptococcus pneumoniae is the main etiology of community-acquired pneumonia (CAP). Although conventional microbiological cultures of blood, pleural fluids, or sputum may document CAP, in more than 50% of cases the causative agent is not detected because of prior administration of antibiotics. A quick detection of urinary antigen helps in obtaining a documented result in case of *Streptococcus pneumoniae* CAP [1]. Urinary antigen test options used to be limited to immunochromatographic assays: the oldest leading reagent proposed by manufactured diagnosis companies is the BinaxNOW® *S. pneumoniae* antigen test (Alere, Jouy-en-Josas, France) [2]. Our aim was to compare the BinaxNOW® *S. pneumoniae* test with the new urinary antigen Sofia® *S. pneumoniae* FIA (Quidel, San Diego, CA, USA) using a novel immunofluorescence technology coupled with an automatic analyzer allowing for laboratory information system (LIS) connectivity, data storage, quality control management and multiple user security features.

2. Materials and methods

A total of 133 urine samples were analyzed with both *S. pneumoniae* antigen tests. Samples were collected from adult patients presenting with a feverish respiratory syndrome within 48 hours after hospitalization. The tests were performed as per manufacturers' recommendations in non-concentrated urine samples. In case of a positive result with the Sofia® *S. pneumoniae* FIA test and a negative result with the BinaxNOW® *S. pneumoniae* test, the urine sample was concentrated by filtration and retested with BinaxNOW® test; thus increasing the sensitivity of this test.

3. Results

Among the 133 included and tested non-concentrated urine samples (Table 1), BinaxNOW® *S. pneumoniae* and Sofia® *S. pneumoniae* FIA tests yielded 122 and 113 negative results and 11 and 20 positive results, respectively (Table 2). A total of nine discrepant results were observed (positive when tested with Sofia® assay but negative with the BinaxNOW® method). Out of these nine results, two samples turned positive when retested with BinaxNOW® after concentration. The overall agreement between the tests was moderate ($\kappa = 0.67$; CI 0.51–0.83) and good ($\kappa = 0.76$; CI 0.60–0.92) before and after concentration, respectively [3]. Seven case patients (patients 2, 3, 5, 11, 12, 13 and 17) remained discordant. Out of the seven case patients with discordant results, five (patients 2, 3, 5, 11, 12) were consistent with *S. pneumoniae* CAP after careful consideration of the medical file (various suggestive clinical features and an infiltrate observed on chest radiography or other imaging technique and/or microbiological data such as positive blood cultures). The CAP diagnosis of two patients (patients 13 and 17) only depended on the urine antigen result.

4. Discussion

This new test enabled the diagnosis of seven additional cases (7/133 = 5.2%) compared with our routine antigen urinary test. The improved detection with Sofia® may be due to the immunofluorescence method of this new test as compared with the colorimetric method of the BinaxNOW® test for the qualitative detection of *S. pneumoniae* antigen in urine samples. Sofia® also offers the advantage of being connected to the LIS allowing an automated traceability as required by the

Table 1
Comparison of results of the Sofia® *S. pneumoniae* FIA assay and the BinaxNOW® *S. pneumoniae* assay.
Comparaison des résultats des antigénuries réalisées à l'aide du test Sofia® versus BinaxNOW®.

		BinaxNOW®			
		On non-concentrated urine		On concentrated urine	
		+	−	+	−
Sofia®	+	11	9	13	7
	−	0	113	0	113

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