DETECTION OF GLUTAMATE DEHYDROGENASE IN STOOL SAMPLES: EVALUATION OF THE IMMUNOQUICK C. DIFFICILE GDH ASSAY (PRO-LAB)

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Objective

The laboratory diagnosis of *Clostridium difficile* infection (CDI) is still difficult. Two- or three-step algorithms based on glutamate dehydrogenase (GDH) detection as a screening method are now recommended by both American and European Guidelines for the diagnosis of CDI. The GDH is a constitutive enzyme produced by *C. difficile* strains and its detection in stools provides information about the presence of the bacterium. The objective of this study was to evaluate the performances of the IMMUNOQUICK C. DIFFICILE GDH (Pro-Lab) (also available in certain countries as Proflow GDH (Biosynex)).

Materials and Methods

This study was performed on all diarrheic stools from patients > 2 years suspected of having C. *difficile* infection and hospitalized in four different university-affiliated hospitals in Paris (Saint Antoine, Tenon, Rotschild and Trousseau hospitals). The test was performed as described by the manufacturer's recommendations with a reading at 10, 15 and 20 minutes (Figure). Culture was performed on TCCA medium (BHI agar supplemented with 5% defibrinated horse blood, 0.1% taurocholate, 250 µg/ml cycloserine, and 10 µg/ml cefoxitin). Culture-positive but IMMUNOQUICK C. DIFFICILE GDH-negative stools were retested using stool aliquots stored at 4° C or -80° C. IMMUNOQUICK C. DIFFICILE GDH-positive but culture-negative stools were processed to enriched culture in a selective broth (containing taurocholate, cycloserine and cefoxitin) that was incubated in anaerobic atmosphere for 48 hours and 96 hours then plated on TCCA.

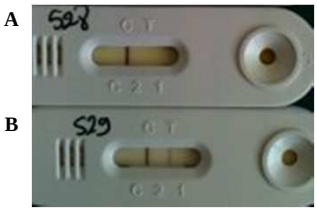

Figure : IMMUNOQUICK C. DIFFICILE GDH **A.** Negative result. **B.** Positive result for GDH. C= control T= test

Discussion-Conclusion

GDH is a cell-associated enzyme antigen found on all isolated of *C. difficile*. Since a few years, EIAs detecting GDH have become commercially available. These tests have displayed a good correlation with culture on selective medium (1). A recent meta-analysis of GDH tests reported that, when compared to toxigenic culture and cytotoxicity assay, the negative predictive value of GDH assays ranges from 94.6% to 100% (2). In this study we evaluated the performances of a new test: IMMUNOQUICK C. DIFFICILE GDH.

We found an excellent negative predictive value for this test and therefore this tests represents a good screening method. Different guidelines now propose to use EIAs test for GDH as a screening method for the diagnosis of CDI, as part of a two or three test algorithm. However GDH is produced by both toxigenic and non-toxigenic strain and a positive result needs to be confirmed by a second test for the diagnosis of CDI.

Results

Three hundred and four consecutive diarrheal stool samples were included between September 5th and December 5th 2011. The prevalence of positive cultures for C. *difficile* was 10.5% (71.9% toxigenic strains and 28.1% non-toxigenic strains).

Results at 10, 15 and 20 min of migration were compared. Best results were obtained at 15 and 20 min of migration (data not shown).

Compared to the culture, sensitivity, specificity, positive and negative predictive values were 84.4% [CI95% 66.5-94.1], 97.1% [CI95% 94.1-98.6], 77.1% [CI95% 59.5-89] and 98.1% [CI95% 95.5-99.3] for the IMMUNOQUICK C. DIFFICILE GDH read after 15 min of migration (Table 1).

Table 1: Performances of the IMMUNOQUICK C. DIFFICILE GDH for the detection of strains of *C. difficile*

		Culture		
		Positive	Negative	
GDH (15 min)	Positive	27	8	35
	Negative	5*	264	269
		32	272	304

* 3 toxigenic strains

Parameters	Estimation (%)	CI 95 %
Sensitivity	84.4	[66.5-94.1]
Specificity	97.1	[94.1-98.6]
PPV	77.1	[59.5-89]
NPV	98.1	[95.5-99.3]

Compared to culture and after resolving discrepant results, sensitivity, specificity, positive and negative predictive values of the IMMUNOQUICK C. DIFFICILE GDH were 90.9% [CI95% 74.5-97.6], 97.4% [CI95% 94.5-98.9], 81.1% [CI95% 64.3-91.4] and 98.9% [CI95% 96.5-99.7] with a lecture at 15 min (Table 2).

Table 2: Performances of the IMMUNOQUICK C. DIFFICILE GDH for the detection of strains of *C. difficile* after resolving discrepant results

		Culture		
		Positive	Negative	
GDH (15 min)	Positive	30	7	37
	Negative	3*	264	267
		33	271	304

* 1 toxigenic strain

Parameters	Estimation (%)	CI 95 %
Sensitivity	90.9	[74.5-97.6]
Specificity	97.4	[94.5-98.9]
PPV	81.1	[64.3-91.4]
NPV	98.9	[96.5-99.7]

References

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