Evaluation of the Platelia™ Aspergillus IgG Biorad® ELISA and Aspergillus LDBIO Diagnostics® Western Blot for ABPA diagnosis in cystic fibrosis patients

Solène Le Gal[1,2], Sally Dipoko[1], Jean Le Bihan[3], Yohann Le Govic[4], Anne Dirou[3], Krista Revert[3], Sophie Ramel[3], Gilles Nevez[1,2], Dorothée Quinio[1,2]

[1]Groupe d'Étude des Interactions Hôte-Pathogène (GEIHP) EA 3142, Angers-Brest, Université de Bretagne Loire, Université de Bretagne Occidentale, Brest, France; [2]Laboratoire de Parasitologie et Mycologie, CHRU de Brest, Brest, France ; [3] Centre de Ressources et de Compétences de la Mucoviscidose de Perharidy, Roscoff, France; [4] Groupe d'Étude des Interactions Hôte-Pathogène (GEIHP) EA 3142, Angers-Brest, Université de Bretagne Loire, Université d'Angers, Angers, France

BACKGROUND

Allergic bronchopulmonary aspergillosis (ABPA) is a bronchial-related hypersensitivity reaction involving predominantly *Aspergillus fumigatus*. It occurs frequently in patients with cystic fibrosis (CF). The diagnosis of ABPA in CF patients remains challenging because clinical signs are common to both diseases (CF and ABPA). ABPA diagnosis is based on clinical, radiological, and biological arguments, including serum anti-*Aspergillus* antibody detection [1].

OBJECTIVES

The objectives of the present study were: *i)* to evaluate the two techniques Platelia ™ Aspergillus IgG Biorad® ELISA and Aspergillus LDBIO Diagnostics® Western Blot (WB) for ABPA diagnosis, *ii)* to choose between two approaches, one that consisted in combining systematically ELISA and WB techniques [ELISA+WB], another one that consisted in performing WB only if ELISA was positive [ELISA+/-WB].

METHODS

We retrospectively enrolled 66 CF patients [median age, 26 years (range, 3-51); sex ratio male/female, 31/35] monitored at the "Centre de Ressources et de Compétences de la Mucoviscidose" (CRCM) of Roscoff - Perharidy (ILDYS foundation) who had undergone serum anti-*Aspergillus* IgG antibody detection using ELISA (Platelia ™ Aspergillus IgG Biorad® ELISA) and WB (Aspergillus LDBIO Diagnostics® Western Blot) assays from November 2014 to May 2015. These patients were sorted in two groups according to ABPA criteria defined by the ISHAM ABPA working group (table 1) [1]. The performance of the two assays and the two above approaches were evaluated through sensitivity, specificity, predictive value (PPV, NPV), and likelihood ratio (LR+, LR-) assessment.

Reference
1. Agarwal R et al. Clin Exp Allergy. 2013; 43:850-73

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Table 1. ABPA criteria defined by the ISHAM ABPA working group [1]

Predisposing factor
Asthma, cystic fibrosis
Obligatory criteria
1. Type 1 Aspergillus skin test positive or elevated anti-Aspergillus specific IgE levels
2. Serum total IgE antibodies > 1000 UI/mL*
At least 2 other criteria
1. Anti-Aspergillus IgG positive detection
2. Radiographic pulmonary opacities consistent with ABPA
3. Total eosinophil count > 500 /mm^3 in steroid naïve patient
*An IgE value<1000 IU/mL may be acceptable if the patient meets all other criteria.

RESULTS - DISCUSSION

- The diagnostic performances of ELISA and WB assays are summarized in table 2. The sensitivity of these 2 assays is excellent (100%) whereas WB assay specificity is surprisingly lower than that of ELISA assay.
- The diagnostic performances of the [ELISA+WB] and [ELISA+/-WB] are summarized in table 2. The results show a better performance of the [ELISA +/- WB] approach.

Table 2. Diagnostic performance of ELISA assay, Western Blot assay, and the combinations of these 2 assays.

	ELISA	WB	ELISA+WB	ELISA+/-WB
Sensitivity	100%	100%	100%	100%
Specificity	58%	26%	15%	63%
PPV	11%	7%	7%	14%
NPV	100%	100%	100%	100%
LR+	2.4	1.4	1.2	2.7
LR-	0	0	0	0

CONCLUSION

The [ELISA +/- WB] approach makes it possible to enhance specificity and to keep excellent sensitivity. According this approach, a negative result provides a strong argument to rule out ABPA diagnosis. Finally, we propose the ELISA as screening assay and the western-blot as a confirmation assay.