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The significance of combination detection of Aspergillus antigen and antibody lateral flow assay for invasive pulmonary aspergillosis diagnosis

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Background: Aspergillus is one of the most common opportunistic fungus that led to invasive fungal disease among human. The mortality rate of invasive aspergillosis is as high as 50-80%, and the mortality rate of patients without effective treatment is almost 100%. Currently, Aspergillus galactomannan ELISA detection test is one useful method for galactomannan (GM) diagnostic. However, due to the complexity of the ELISA test operation and the requirement for expensive instruments, its application is limited by the laboratory level. Thus, Aspergillus antigen and antibody lateral flow assay was introduced to make the invasive pulmonary aspergillosis diagnosis more rapid, simple and readable.

Methods: All adult patients who were diagnosed with IPA whose blood samples were available were enrolled in Pudong New Area Hospital, between January 2020 and December 2020. The serum levels of Aspergillus-specific IgG, IgM and galactomannan were measured simultaneously by FungiXpert® Aspergillus IgG, IgM and galactomannan lateral flow assay.

Results: A total of 135 patients were enrolled in this study, including 63 IPA patients, 72 non-IPA patients. The sensitivities and specificities of Aspergillus-specific IgG, IgM tests and GM test were 81.0% and 51.4%, 92.1% and 79.1%, 50.8% and 90.3% respectively. And the sensitivity and specificity of combination detection of the three tests is 93.6% and 95.8%.

Conclusions: In the process of intermittent release of galactomannan antigen into the blood, it is easily cleared by phagocytes in the blood and is not easily captured during the detection. Therefore, the specificity of GM detection is higher, but the sensitivity is lower. However, after Aspergillus infection, as long as the antigen does not disappear, the antibody can exist in the serum for a long time. Therefore, the Aspergillus antibody detection test can effectively avoid the shortcomings of the GM test, and the combined detection can highly improve the detection accuracy. The combination detection of FungiXpert® Aspergillus IgG, IgM and galactomannan lateral flow assay exhibits excellent sensitivity, specificity and accuracy for serological diagnosis of IPA.