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Assessment of serum (1,3)-beta-D-glucan and galactomannan kinetics in a retrospective study in haematological patients with invasive aspergillosis

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Background: *Aspergillus* is an important opportunistic pathogen affecting immunocompromised patients. In these patients, the disease is associated with high mortality. Although (1,3)-beta D glucan (BDG) measurement in blood are used clinically for the detection of opportunistic fungal diseases, few studies determined the performance of BDG as early marker of invasive aspergillosis in hematological patients and its prognostic value.

Material/methods: A retrospective study was conducted to compare the performance of BDG and GM detection in patients with invasive aspergillosis (MSG/EORTC) between January 2014 and June 2015 at the Nantes university hospital, France. The tests for galactomannan (Platelia Aspergillus®, Bio-Rad , Marnes La Coquette, France) and BDG (Fungitell®, Cape Cod) were performed according to the manufacturer's recommendations for testing serum. The positive cut-off for BDG was 80 pg/mL. For each assay, a standard curve of five points (500, 250, 125, 62.5, 31.25, and 0 pg/mL) was constructed. The disposable materials used for BDG dosage were glucan free.

Results: During the period, a total of 84 serum from 11 patients with probable invasive aspergillosis were retrospectively collected. In 3 of 11 cases of IA, BDG was positive earlier than GM (time lapse from 9 to 15 days), in 4/11 cases, BDG was positive at the same time as GM, and in 4/11 cases, BDG was positive after GM. In 5 of 9 cases, BDG was positive before contributive imaging findings. Three patients developed concomitant bacteriemia and BDG levels remained negative (*E. faecium, Citrobacter braakii)* or increased above the cut-off (*Corynebactrerium jeikeium*). Finally one patient maintained a high level of GM during three weeks after voriconazole administration, without identification of false positive origins. Persistence of serological markers was not necessarily associated with poor outcome in patients.

Conclusions: In conclusion, our findings suggest that measuring the serum or plasma BDG levels has a high level of accuracy in the discrimination of patients with IA. The use of the BDG assay in combination with the GAL assay could be of great interest to clinicians who can use these assays to exclude or confirm suspected IA, particularly in patients with haematological malignancies. The BDG detection is useful, however, the test has a great limitation since the procedure is completely manual.