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

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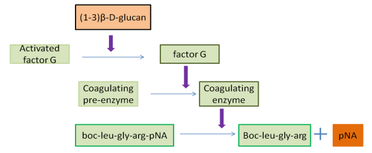
Introduction and purpose

Invasive aspergillosis is the 3rd cause of life-threatening fungal infection in France. Patients affected by malignant hemopathies represent the target population because of the use of therapeutic strongly and durably cytotoxiques for the bone marrow. In these patients, the disease is associated with high mortality. Since an early therapeutic intervention is essential to improve the survival of patients, it is necessary to know the efficiency of the used markers 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.

Materials et methods

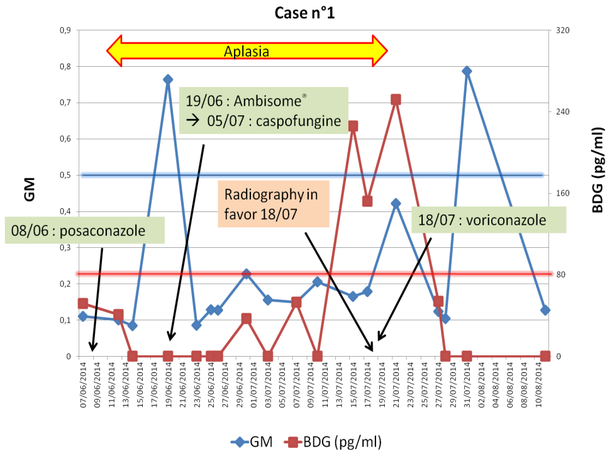
A retrospective study was conducted to compare the performance of panfungal BDG and GM detection in patients with invasive aspergillosis probable or proven (MSG/EORTC) between January 2014 and June 2015 at the Nantes university hospital, France. The tests for galactomannan (Platelia Aspergillus®, Bio-Rad , 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.



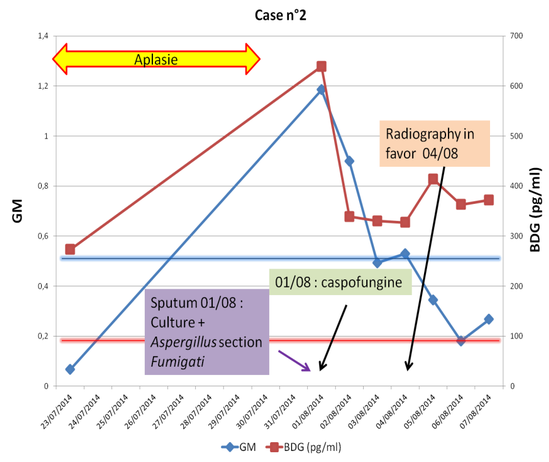
Results

During the period, a total of 84 serum from 11 patients with probable invasive aspergillosis were retrospectively collected: 4 acute leukaemia, 4 lymphomas, 2 chronic lymphocytic leukaemia, 1 hairy cell leukaemia.

The (1-3)β-D-glucan : a marker of clinical evolution



➔ **In this patient a decrease of (1-3) ß-D-glucan would support a favorable evolution**



➔ **An increase and/or a persistence of (1-3) ß-D-glucan would represent unfavorable developments**

…but persistence of serological markers was not necessarily associated with poor outcome in patients.

Performance of (1-3) BDG in comparison to GM

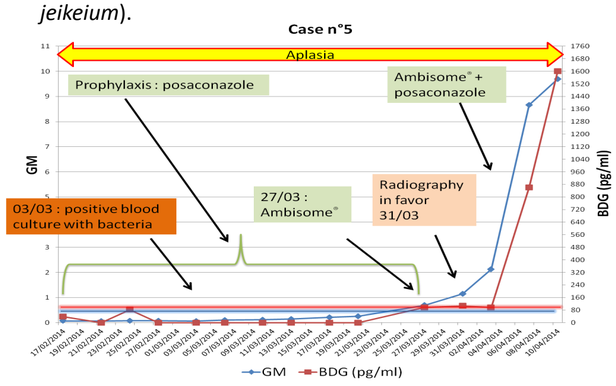
Variable results : In 3 of 11 cases of IA, BDG was positive earlier than GM (time lapse from 9 to 15 days), in 4/11 cases, BDG was positive at the same time as GM, and in 4/11 cases, BDG was positive after GM.

Precocity of (1-3)β-D-glucan

Culture : in 85.7 % of the cases where the culture is realized, (1-3) ß-D-glucan is more earlier.
Radiography : In 5 of 9 cases, BDG was positive before contributive imaging findings.

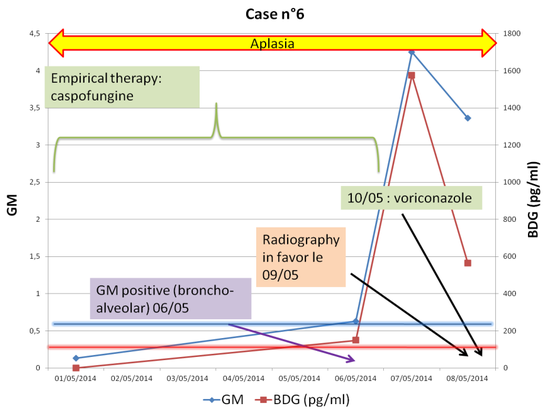
(1-3)β-D-glucan and bacteriemia

Three patients developed concomitant bacteriemia and BDG levels remained negative (*E. faecium*, *Citrobacter braakii*) or increased above the cut-off (*Corynebactrerium jeikeium*).



➔ **Lack of influence of concurrent bacteremia**

(1-3)β-D-glucan and echinocandins



➔ **Lack of influence of treatment with echinocandins**

Conclusion

In conclusion, our findings suggest that measuring the serum BDG levels could have a high level of accuracy in the discrimination of patients with IA. The use of the BDG assay in combination with the GM assay could be of great interest to clinicians who can use these assays to exclude or confirm suspected IA, particularly in patients with hematological malignancies.