

# NEW PARAMETERS IN FUNGAL TESTING IN RELATION TO THE APPROPRIATE ANTI-FUNGAL TREATMENT

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Invasive fungal infections are a major health problem in immunocompromised or critically ill patients. The clinical manifestations vary and can range from colonization to active infection. Patient with neutropenia, HIV infection, bone marrow and solid organ transplantation, cancer, diabetes mellitus, severe burn, the use of antineoplastic and immunosuppressive agents, broad-spectrum antibiotics are among many others predisposing factor for invasive fungal infections. In the absence of these factors, fungi cause mild, self-limited infections that typically involve mucocutaneous surfaces. If invasive fungal infections develop in an immunocompetent host, indicated a genetic defects causing innate or adaptive immune dysfunction. *Candida* spp. and *Cryptococcus* spp. are the yeasts most frequently isolated in clinical practice. While the most frequent filamentous fungi isolated are *Aspergillus* spp. Just like some bacterial infections are resistant to antibiotics, some fungi develops resistance to the antifungal medications. The antifungal antibiotics target various stages of metabolic pathways and are placed in different groups including azoles, polyenes, fluoropyrimidine analogs, echinocandins, morpholines, allylamines and thiocarbamates. The most antifungal resistance occurs in *Candida* species.

Diagnosis of fungal infection remains a problem because signs and symptoms are non-specific and colonization is difficult to distinguish from invasive disease.

Direct smears of samples with KOH is the most rapid, cost-effective and sensitive method for the diagnosis of fungal infections. Culture of clinical specimens is the gold standard. Other methods such as histopathology may also be used. There were fungal serologic detection such as antibodies (*Histoplasmosis*, *Coccidioidomycosis*) and antigen (*Cryptococcosis*, *Aspergillus*, *Candidosis*, *Histoplasmosis*). In some country Galactomannan antigen testing of blood is routinely done. Molecular or fungal nucleic acids amplification, currently is being applied for identification and antifungal resistance test.

**Keywords:** invasive fungal infection, immunocompromised, fungal detection antifungal resistance

## 1. Pendahuluan

Frekuensi infeksi jamur, terutama infeksi jamur invasif (*invasive fungal infection/IFI*), telah meningkat secara dramatis dalam beberapa tahun terakhir, menyerang individu dengan imunokompromais akibat infeksi HIV/AIDS atau keganasan; atau akibat pemberian antibiotik spektrum luas, kortikosteroid dosis tinggi dan lama pada transplantasi organ.<sup>1</sup>Diagnosis dini dan akurat infeksi ini penting agar terapi antijamur tepat waktu sehingga mengurangi penggunaan yang tidak perlu karena agen antijamur beracun.<sup>2</sup>Selain itu perlu diwaspadai, sama seperti resistensi bakteri pada antimikroba, berbagai obat antijamur saat ini sudah menunjukkan peningkatan resistensi. Dalam makalah ini akan dibahas mengenai morfologi jamur, predisposisi infeksi jamur, gejala klinis, pemeriksaan laboratorium baik konvensional maupun metode terbaru untuk diagnosis infeksi jamur dan uji kepekaan obat antijamur.

## 2. Morfologi Jamur

Jamur memiliki dinding sel luar yang rigid dengan membran sitoplasma di bagian dalamnya. Dinding sel jamur tersusun dari polisakarida manan, glukukan dan kitin bersama protein struktural. Membran sitoplasma mengandung ergosterol, dan mikrotubulus yang terdiri dari