Conclusion. The D-index may be a useful tool to stratify high-risk pediatric patients according to risk of IFD. The c-D-index, particularly, may be a useful tool to guide for empiric antifungal therapy and diagnostic testing. Prospective multi-center studies using these tools are required to refine the clinical approach to IFD.

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1159. Echinocandins Dosing in Obese Patients: A Systematic Review
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Session: P-52. Medical Mycology

Background. Echinocandins are a milestone in antifungal chemotherapy given their fungicidal properties with improved toxicity profiles compared to other antifungal agents. Echinocandins are used in the empiric treatment of invasive candidiasis and aspergillosis in critically ill, neutropenic, and transplant patients. There is emerging evidence that obese patients treated with echinocandins antifungal agents have lower plasma serum concentration and faster clearance. The objective of this review was to systematically evaluate the available evidence for echinocandins dosing in obese patients.

Methods. A systematic review of PubMed, Embase, Cochrane library from inception until June 8, 2020 was conducted by 2 authors. Studies with data for micafungin, anidulafungin, or caspofungin in obese patients’ exposure [body mass index (BMI) 30 or greater] were included. Studies for patients on renal replacement therapies, extracorporeal membrane oxygenation support, and language other than English were excluded.

Results. Twenty-five studies met the inclusion criteria; micafungin (n=10), caspofungin (n=8), and anidulafungin (n=7). In micafungin, the correlation between obesity and increasing systemic clearance and reduced exposure was reported. Some studies reported even lower systemic exposure with morbid obesity, BMI greater than 40. The evidence was also consistent with anidulafungin, two studies revealed that body weight had inverse correlation with anidulafungin exposure. Anidulafungin exposure was about 30% lower in obese patients. Furthermore, caspofungin exposure was also reduced in obese patient as demonstrated in several studies.

Conclusion. Adequate antifungal exposure is a key in success treatment, and there are several factors that can influence exposure of echinocandin antifungal agents. There is consistent evidence revealing lower echinocandins exposure in obese patient. Research is needed to determine outcomes of fungal infections of obese patients, and perhaps the need for dose adjustment in obese patient population.

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1160. Ecological Study for Pulmonary Blastomycosis
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Session: P-52. Medical Mycology

Background. There has been a global increase in people who are intravenous drug user, diabetic, and elderly (aged greater than 65 years). These characteristics may alter the incidence of new diseases and potentially affect how diseases are diagnosed. As such this study’s purpose was to investigate baseline characteristics of patients with pulmonary blastomycosis. Case studies for Blastomyces have demonstrated positive cultures in 72% to 87% of patients. Therefore data will be analyzed to determine if there is any significant difference in culture results.

Methods. This study was a retrospective single-center ecological study. Patient charts were identified via ICD code search for blastomycosis. All protected health information was de-identified following data collection.

Results. 32 patients were identified with either pathology or culture proven blastomycosis. 8 patients (25%) had positive fungal cultures for blastomycosis. The average age of patients with pulmonary blastomycosis was 59.5 years old with 11 elderly patients (34%). There were 11 females (34%); 2 with hepatitis C (6%); 12 with diabetes (38%); 10 with immunosuppression (pancytopenia, chronic steroid usage, organ transplant, cystic fibrosis) (32%); 9 with COPD (32%); 21 with Tobacco abuse (67%); 7 with cancer (22%); 7 with work exposure (working around turned dirt or indoor mold) (22%) and 1 with opiate use (3%). No significant difference was found for culture results.

Baseline Characteristics

| BASELINE CHARACTERISTICS |
|--------------------------|
| Elderly                  |
| Female                   |
| Hepatitis C              |
| Diabetic                 |
| Immunosuppressed         |
| COPD                     |
| Tobacco Abuse            |
| Cancer                   |
| Work related             |
| Substance use            |

| PATHOLOGY DIAGNOSIS OF BLASTOMICOSIS | CULTURE DIAGNOSIS OF BLASTOMICOSIS |
|--------------------------------------|-----------------------------------|
| Elderly                              |
| Female                               |
| Hepatitis C                          |
| Diabetic                             |
| Immunosuppressed                     |
| COPD                                 |
| Tobacco Abuse                        |
| Cancer                               |
| Work related                         |
| Substance use                        |

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Conclusion. Our culture results were exceedingly low in part due to some samples not being collected for fungal culturing and having to send-out the samples. The average age was consistent with the endemic region of Tennessee around 59 the previous 10 years. 2/3 of the patients were tobacco abusers which may have contributed to some impaired ability to clear the fungal spores. Less than half of the patients were elderly, diabetic, immunocompromised, or intravenous drug users therefore endemic in-occulation may still be the main cause.

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1161. Effectiveness of Posaconazole in the Treatment of Rare Invasive Fungal Infections: A Systematic Literature Review
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Session: P-52. Medical Mycology

Background. Rare invasive fungal infections (IFIs) such as chromoblastomycosis (CBM), fungal mycetoma (mycetoma), hyalohyphomycosis/phaeohyphomycosis (hyalo/phaeo), and mucormycosis (mucor) cause significant morbidity and mortality in immunocompromised patients. Few effective treatment options are available for these IFIs, therefore we assessed the clinical efficacy of posaconazole, a broad-spectrum triazole antifungal compound with demonstrated activity against IFIs.

Methods. We performed a systemic literature review of Medline and EMBASE to identify studies published from 2005 (year of posaconazole approval) to October 30, 2019, reporting the efficacy/effectiveness of posaconazole monotherapy or combination therapy for treating CBM, mycetoma, hyalo/phaeo, and mucor. Two reviewers screened and extracted data based on predefined PICO5 criteria. Effectiveness outcomes included cure, response, relapse, radiologic improvement, mortality and any other effectiveness measures reported. Study quality was assessed using National Institute for Health and Care Excellence-recommended checklists. A narrative descriptive summary was used to summarize study findings.

Results. Of 2612 articles identified, 351 articles (mostly case reports) were included. Positive clinical outcomes with posaconazole therapy were observed in most patients with CBM (73.9%, 17/23), mycetoma (100%, 2/2), hyalo/phaeo (53.3%, 49/92), and mucor (66.7%, 36/54/485). The population for mycetoma was small; only 2 positive cases (Figure). Overall survival was 70% or greater across the IFIs examined. Posaconazole efficacy and mortality differed by line of therapy as well as for monotherapy versus combination therapy. Positive response was higher in second line monotherapy than first line monotherapy in CBM and mucor. Higher mortality was observed with combination therapy than monotherapy in hyalo/phaeo and mucor infections (except for first line use in mucor).

Figure. Overall Results of Posaconazole Treatment

Conclusion. Despite the rarity of these IFIs, substantial data have been published since posaconazole’s initial approval in the year 2005, and the evidence demonstrates that posaconazole is an effective therapeutic option alone or in combination for the treatment of these rare IFIs.

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1162. Engraftment fever (EF) in Pediatric stem cell transplantation (SCT): Risk Factors, Etiology and Outcomes
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Session: P-52. Medical Mycology

Background. Engraftment fever (EF) during stem cell transplantation (SCT) is likely due to non infectious causes like immune reconstitution syndrome (IRS) or engraftment syndrome (ES). Few studies have looked at the rate of infection causing fever during engraftment. There is no good evidence to guide the approach to evaluation and empiric treatment of infections during EF.

Methods. Retrospective record review of pediatric SCT (autologous and allo-genic) patients with a diagnosis of febrile neutropenia (FN) during engraftment period (days +7 to +30 post transplant), FN episodes classified as either EF or non-engraftment fever (NEF). EF = new onset fever in temporal relationship to neutrophil recovery (4 days before through 1 day after neutrophil engraftment (ANC >500/mm3). NEF = fever without signs of neutrophil recovery (ANC <100/mm3) without significant rise ≥4 days of fever onset. Only first FN during engraftment was included. Episodes meeting neither criteria were excluded.

Results. 112 patients had 115 FN episodes (FNEs) identified: NEF 81 (71.5%); EF 34 (28.5%). In multivariable analysis: Neuroblastoma as underlying diagnosis (odds ratio [OR]=3.2, 95% CI 2.31-6.54, P< 0.001), G-CSF administration before day +7 (OR=2.8, 95% CI 1.92-4.65, P=0.03), absolute monocyte count (AMC) >100/mm3 at FN presentation (OR=2.9, 95% CI, 1.11 to 7.55, P<0.02), were associated with an increased risk of EF compared with NEF. Most EF episodes (26/34, 76%) had no specific infectious etiology identified; 8 had IFIs (24%) [3 proven, 2 probable, 3 possible). IFI rate was higher in EF than NEF group (24% vs 5%) (OR=4.5, 95% CI, 2.11 to 9.55, P< 0.01). EF episodes were more likely to be admitted to the intensive care unit (OR=2.3, 95% CI, 1.88 to 6.35) and had higher 30-day mortality (OR =4.52, 95% CI, 0.37 to 6.55) than NEF.

Table 3

| Table 3. Outcomes associated with Engraftment fever compared with NEF |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                | NEF N (%)       | EF N (%)        | OR               | LCI              | UCI              | P-value         |
| Total           | 81              | 34              | 0.04             |                  |                  |                 |
| Yes             | 17              | 21.33           | 2.365            | 0.881            | 6.352            |                 |
| No              | 64              | 78.67           | 1.617            |                  |                  |                 |
| Reference       |                 |                 |                  |                  |                  |                 |
| Died            | 0.001           | 0.001           |                  |                  |                  |                 |
| Yes             | 2               | 4.24            | 4.528            | 0.357            | 6.55             |                 |
| No              | 79              | 97.63           | 1.00             |                  |                  |                 |
| Reference       |                 |                 |                  |                  |                  |                 |

Table 2

| Table 2. Infections associated with Engraftment fever compared with NEF |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                | NEF N (%)       | EF N (%)        | OR               | LCI              | UCI              | P-value         |
| Total           | 81              | 34              | 0.01             |                  |                  |                 |
| fungal          | 0.01            | 0.01            |                  |                  |                  |                 |
| Yes             | 6               | 7.98            | 3.855            | 1.32             | 8.228            |                 |
| No              | 75              | 93.02           | 1.00             |                  |                  |                 |
| Reference       |                 |                 |                  |                  |                  |                 |
| fungal_type     | 0.01            | 0.01            |                  |                  |                  |                 |
| None            | 75              | 67.21           | 1.00             |                  |                  |                 |
| Reference       |                 |                 |                  |                  |                  |                 |
| Probable        | 4               | 13.33           | 1.302            | 0.375            | 4.522            |                 |
| Proven          | 1               | 3.85            | 0.547            | 0.093            | 3.231            |                 |
| No              | 76              | 96.18           | 0.58             | 0.098            | 3.433            |                 |
| Reference       |                 |                 |                  |                  |                  |                 |
| BSI             | 0.03            | 0.03            |                  |                  |                  |                 |
| Yes             | 15              | 18.03           | 0.138            | 0.016            | 1.205            |                 |
| No              | 66              | 81.97           | 1.00             |                  |                  |                 |
| Reference       |                 |                 |                  |                  |                  |                 |
| PNA             | 0.04            | 0.05            |                  |                  |                  |                 |
| Yes             | 5               | 8.02            | 5.03             | 2.30             | 8.49             |                 |
| No              | 76              | 91.98           | 1.00             |                  |                  |                 |
| Reference       |                 |                 |                  |                  |                  |                 |
| VURTI           | 0.01            | 0.01            |                  |                  |                  |                 |
| Yes             | 11              | 18.03           | 10.925           | 4.83             | 28.121           |                 |
| No              | 50              | 81.97           | 1.00             |                  |                  |                 |

Conclusion. Engraftment fever may have an infectious component. Work-up to exclude IFI and empirical antifungal therapy should be considered especially with prolonged fever and supportive clinical or radiological data. Large multi-center prospective studies are needed to further define infectious complications and determine the approach to engraftment fever. Early detection of IFI in this high-risk group may lead to improved morbidity and mortality.

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1163. Epidemiology of Candidemia: Can Candida Spread from Patient to Patient in the Hospital?
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Session: P-52. Medical Mycology

Background. Candidemia has become an increasingly important infection in recent years. Antifungal drug resistance in non-albicans species of Candida is increasingly common. Recent global emergence of Candida auris is a concern owing to person-to-person transmission and survival on fomites. Our study aimed to determine if hospital transmission of diverse Candida species is occurring similar to what is seen