

CHEMICAL APPLICATIONS IN ANTI FUNGAL AGENTS AND CLASSIFICATION OF FUNGAL INFECTIONS

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Abstract -Fungal infections are common in human beings and animals. The recent development of novel antifungal agents as significantly contributed to the successful treatment of fungal diseases. Most of these agents are fungistatic and do not kill the fungal cell. Thus facilitating the emergency of resistance species, which further complicate therapy. Alternatively, some of the most effective anti fungal agents are too toxic after continuous use or can only be administered intravenously. The ideal antifungal drug would be non toxic, fungicidal, and amenable to self administration. Anti fungal agents have wider range of applications.

Keywords: Antifungal agents, fungicidal, candidiasis, Topical medications, Seborrhotic dermatitis.

Introduction

An antifungal agent is a drug which selectively kills fungal pathogen with minimal toxicity to the host. This chapter summarizes the general applications of antifungal agents. Novel antifungal drug (NB-002) developed recently for topical applications in humans. The incidence of fungal infections increases with increase in antibiotic usage and increase in immune suppressed populations.

Paediatric infections	Animal infections	Topical infections
Candida diaper dermatitis	Cryptococcosis	Pityriasis versicolor
Mucocutaneous candidiasis	Aspergilliosis	Tinea pedis

Oropharyngeal candidiasis and Tinea capitis	Histoplasmosis	Tinea unguium
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Anti fungal agents used for treatment of some Paediatric infections

Candida diaper dermatitis (CDD)

Candida Diaper Candidiasis is general term describing any of a number of inflammatory skin conditions that can occur in the diaper area. CDD is common during the second to fourth months of life in healthy infants. One hundred percent of the newborn infants and 88% of the older children who suffered from candidal diaper rashes harbored *Candida albicans* in the intestine. *Candida albicans* is present in the feces of 90% of such infants.

Topical antifungal therapy is also necessary. Miconazole ointment with zinc oxide petroleum base was safe and effective, anti fungal drug. Ointments, creams and powders of nystatin, miconazole and clotrimazole are available. It is still not clear whether concomitant oral and topical antifungal should be recommended. Some anti-inflammatory preparations are used to treatment of CDD.

Mucocutaneous candidiasis

Mucocutaneous candidiasis is common and is an immune disorder of T cell it is persistent superficial infections of the skin, mucous membrane, and nails.

Mucocutaneous candidiasis is caused by Candida organism usually Candida albicans.

Anti fungal agents such as clotrimazole, ketoconazole, itraconazole, and fluconazole are dramatic improvement in the treatment of all forms of CMCs. However, following the use of these drugs. *albicans* strains resistant to azole antifungal drugs have been subsequently isolated requiring novel therapeutic agents. These include flucytosine, amphotericin B, the newest azoles and, more recently, echinocandins.

Thrush

Candidiasis of the mouth and throat, also known as thrush or oropharyngeal candidiasis. Oropharyngeal candidiasis (thrush) is one of the paediatric infections. This is mainly effect the infants. Oropharyngeal candidiasis (thrush) may start as early as seven days after birth.

Prescription treatment such as oral fluconazole, clotrimazole troches or nystain suspension usually provides effective treatment for oropharyngeal candidiasis.

Generally some oldest therapeutic agents and some anti fungal agents are used for treatment of Oropharyngeal candidiasis. The oldest therapeutic agent, is Topical gentian violet, it is moderately effective against thrush but it is prolonged use can cause irritation and nausea. Nystain, Fluconazole, Clotrimazole, imidazole, and ketoconazole are anti fungal agents. Latest anti fungal agent imidazole is divided in two types First generation of imidazole and second generation of imidazole.

The first-generation imidazoles, such as miconazole and clotrimazole, are effective drugs. However, miconazole gel and oral preparation of clotrimazole are not licensed in Canada. Chronic oral candidiasis can respond to clotrimazole troches.

Second-generation imidazoles, such as fluconazole and itraconazole or other new oral anti fungal agents Nystain oral suspensions.

SEBORRHEIC DERMATITIS

Seborrhea dermatitis is the most common paediatric superficial dermatophyte infection. Seborrhea dermatitis is also called as tinea capitis. tinea capitis does not respond well to topical therapy alone, oral therapy is required Seborrhea dermatitis and pityriasis capitis (cradle cap) are common, but usually mild, scalp infections caused by *Malassezia* species (eg, *Malassezia furfur*).

The condition often resolves with mild soap application. Shampoos containing selenium sulfide are useful in severe forms. antifungal medications, such as ketoconazole, itraconazole, terbinafine, and fluconazole, have been reported as effective alternative therapeutic agents for tinea capitis. Of these agents, itraconazole and terbinafine are used most commonly.

Anti fungal agents used for treatment of some animal infections

Cryptococcosis

Cryptococcosis is a fungal disease that affects the respiratory tract, eyes, skin, and central nervous system of dogs.

The drug of choice for initial therapy in CNS cryptococcosis is amphotericin B. It may be used alone or in combination with flucytosine. Ketoconazole, itraconazole or fluconazole have also been successful as treatment. Other drugs also used that are amphotericinB include amphotericine B lipid complex, amphotericine B cholesteryl complex and, amphotericine B colloidal dispersion.

Aspergillosis

Aspergillosis is a fungal infection seen in mostly young dogs that affects the long

nose. Aspergillosis is the name given to a wide variety of diseases caused by infection by fungi of the genus *Aspergillus*. The most common cause is *Aspergillus fumigatus*.

Anti fungal drugs such as voriconazole and liposomal amphotericin B are used for treat aspergillosis diseases. Other drugs used, such as amphotericin B, caspofungin, flucytosine, itraconazole, are used to treat this fungal infection. However, a growing proportion of infections are resistant to the triconazoles drugs are resistance to growth of *Aspergillus fumigatus*.

Histoplasmosis

Histoplasmosis is an infection that occurs from breathing in the spores of the fungus *Histoplasma capsulatum*. It is primarily affect the lungs. Bird, chicken and bat manure provide a rich environment for the fungus, but other origins have recently been reported. Antifungal agents usage, depending on the form or stage of disease. Sometimes, long-term treatment with antifungal drugs may be needed.

Antifungal medications are used to treat severe cases of acute histoplasmosis and all cases of chronic conditions. Typical treatment of severe disease first involves treatment with amphotericin B, followed by oral itraconazole. Treatment with itraconazole will need to continue for at least a year in milder cases, and also oral itraconazole or ketoconazole is sufficient.

Anti fungal agents used for treatment of Topical infections

PITYRIASIS VERSICOLOR

Pityriasis versicolor is a common infection of healthy people caused by a fungus that is commonly found on normal human skin. Pityriasis versicolor is caused by Yeast of the genus *Malassezia*, which may also be found on normal skin.

Topical anti fungal agents are used to treat active Pityriasis versicolor. They are include, 1)Propylene glycol 2)sodium thio sulphate solutions 3)selenium sulfide 4)Terbinafine gel 5)ciclopirox 6)topical azoles including clotrimazole miconazole,ketoconazole. Antifungal preparations can be effective, but recurrences are common Topical ketoconazole, selenium sulfide and clotrimazole are the most common treatments.

TINEA PEDIS

Athlete's foot is a common superficial fungal infection of the foot. The medical term is tinea pedis. Causes include *T rubrum*, *T mentagro-phytes* and *E floccosum*. This is uncommon in young children.

Antifungal powders or creams can help control the infection. These generally contain miconazole, clotrimazole, or tolnaftate. Keep using the medicine for 1 - 2 weeks after the infection has cleared to prevent the infection from returning.

If athlete's foot does not get better in 2-4 weeks with self-care, or frequently returns, see your health care provider. The health care provider may prescribe stronger antifungal medications, such as ketoconazole or terbinafine.

Tinea unguium

Tinea unguium is also called as fungal nail infection or Onychomycosis. This nail infection caused by fungi. such as various fungi species of *Trichophyton* and occasionally by *candida albicans*. Generally ointments and creams are used to treat tinea unguium. In last stage of this infection creams and ointments generally do not help cure the infection.

Latest anti fungal drugs such as Fluconazole griseofulvin, terbinafine,

and itraconazole are used to treat this condition.

CONCLUSION

Previous studies have been revealed the uses of some of the anti fungal agents. Number of anti fungal agents has been isolated for the treatment of advanced fungal infections. This chapter concentrates mainly on fungal infections and general applications of anti fungal agents.

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