A Twenty Two Year Survey of Mycotic Infections in Peshawar Region

Taj B Uppal* and Raza Muhammad Khan**

* 22, Chinar Road, University Town, Peshawar.
** Department of Dermatology, Khyber Medical College, Peshawar.

Clinically suspected cases of Dermomycoses, deep tissue mycoses and pulmonary mycoses, totalling 2,037, were examined and subjected to mycological studies over a period of twenty two years. On direct examination, fungal elements were found in 1,173 specimens, including 114 of Malassezia furfur and one of Pityrosporum. After culture, growth was obtained in 489 specimens, some slide negative specimens were also positive in culture. The commonest clinical type was Tinea capitis, and Trichophyton violaceum was the most common organism isolated amongst the species isolated. Amongst the Microsporum species, Micro. ferrugineum was the most common species isolated, and the main clinical disease caused by it was Tinea capitis. Cases of Chromoblastomycosis were also found.

Introduction

Fungi are ubiquitous, eukaryotic organisms with cell walls, whose nuclei contain several chromosomes, a nucleolus and a nuclear envelope that persists during nuclear division. Majority of them are saprophytic, living in soil and on plants, but some of them are pathogenic causing human disease. Most species that do infect humans are limited by nutritional requirements and by host defence mechanisms to invasion of superficial skin and subcutaneous tissues. Most of these cutaneous infections are the work of a homogeneous group of keratinophilic fungi known as dermatophytes.

The dermatophytes are a group of closely related fungi that have the capacity to invade keratinised tissues (skin, hair and nails) of humans and other animals to produce an infection, dermatophytosis. Infection is generally cutaneous, limited to the non-living cornified layers, because of the inability of the fungi to penetrate the deeper tissues or organs of immunocompetent hosts.

The etiologic agents of the dermatophytoses are classified into three anamorphic (asexual or imperfect) genera, Epidermophyton, Microsporum, and Trichophyton, of anamorphic class Hyphomycetes of the Deuteromycota. The descriptions of the genera essentially follow the classification scheme of Emmons, on the basis of conidial morphology and formation of conidia and are updated following the discovery of new species. Effective control of mycotic diseases in any community depends upon an accurate understanding of various factors leading to the spread of infection and the data of different types in the community.

There are no comprehensive studies of dermomycoses in this region, only a few short-term studies are available.

This survey of etiolocial agents of superficial and deep mycoses was conducted over a period from 1975 to 1997, on patients referred to the Pathology department of Khyber Medical College, Peshawar, to find the incidence of different etiologic agents of mycoses in this region.

Patients and Methods

Patients suspected clinically of suffering from mycotic infections were referred to the Pathology Department of Khyber Medical College, Peshawar, by the dermatologists of the two teaching hospitals of Peshawar (Hayat Shaheed Teaching Hospital and Lady Reading Hospital) and were included in this study.

The superficial lesions on skin were scraped with a sterile blade, after thoroughly cleaning the area with 70 percent alcohol, hair stumps were collected, after cleaning, with a sterile forceps.
Sputum and biopsy tissues were sent in sterile containers.

Specimens were mounted in 20 percent Potassium hydroxide on a slide and examined for the presence of fungal elements. All the specimens, whether containing fungal elements or not, on direct examination, (including those containing Malassezia furfur, which were actually diagnosed on direct slide examination) were cultured on two tubes of Sabouraud’s glucose agar, one of the tubes containing Penicilllin and Streptomycin, and the other Penicilllin, Streptomycin and Cyclohexamide. For examination and culture of biopsy tissues, the specimens were first ground in a tissue grinder. All the cultures were incubated at 25 degrees centigrade.

All the specimens from which fungi commonly regarded as contaminants were grown were recultured. If the growth was of the same fungus, then it was regarded as the causative organism of the lesion.

The fungi isolated were identified by their colonial morphology and the morphology of the spores in a teased out specimen on a slide, if there was any confusion, then slide cultures were performed for morphological study.

Candida spp. and Cryptococcus spp. were identified by their morphology and biochemical reactions.

For erythrasma, the specimens were cultured on Loeffler’s serum, incubated at 37°C, and the isolate identified by colonial morphology and biochemical tests.

Results

During the period from April 1975 to July 1997, 2037 patients with suspected mycoses were examined. The results obtained represent the types of infections in N.W.F.P. and neighbouring Afghanistan, since the patients were from all social classes and were fairly well distributed geographically, including Afghan refugees.

On direct examination fungal elements were seen in 1173 of the specimens, including 114 of Malassezia furfur. Of all the patients in whom fungal elements were found 920 were males and 253 females.

The types of lesions in the patients varied from different anatomical sites and so were the specimens taken for examination from these patients.
Table 1: Showing the Numbers of Different Specimens in which Fungal Elements were Seen and the Numbers from which Pathogens were Isolated.

<table>
<thead>
<tr>
<th>Type of Specimen</th>
<th>Numbers in which Fungal Elements were found</th>
<th>Numbers from which Pathogens were Isolated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin</td>
<td>927</td>
<td>409</td>
</tr>
<tr>
<td>Hair with ectothrix</td>
<td>83</td>
<td>21</td>
</tr>
<tr>
<td>Hair with endothrix</td>
<td>111</td>
<td>60</td>
</tr>
<tr>
<td>Hair neither ecto.</td>
<td>nor endothrix but growth positive</td>
<td>22</td>
</tr>
<tr>
<td>Nails</td>
<td>100</td>
<td>07</td>
</tr>
<tr>
<td>Sputum</td>
<td>05</td>
<td>04</td>
</tr>
<tr>
<td>Tissue, for deep mycoses</td>
<td>06</td>
<td>02</td>
</tr>
</tbody>
</table>

There was also a great variation in the distribution of fungal infections according to sex, males were more frequently infected than females. (Table 2).

The distribution of different species as to the more commonly involved site is shown in Table 3.

Amongst the Microsporum species, Micro. ferrugineum was the most common organism isolated, mostly it was isolated from hairy areas, scalp, chin, upper lip and lower lip.

Trichphytons were the single most common pathogens isolated and the scalp was the most common site involved (Tinea capitis). Amongst the Trichophytons, Tricho. violaceum and Tricho. mentagrophytes were the most common species isolated in the local populations, and Tricho. schoenleini was mainly isolated from Afghan refugees in Tinea capitis, in cases in which it was isolated from Tinea corporis, the whole body was covered with dry skin and all the members of their families had the same signs and symptoms.

Table 2: Sex Wise Distribution of Pathogens Isolated.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Numbers</th>
<th>Microsporum</th>
<th>Trichiphyton</th>
<th>Epidemiphiontyon</th>
<th>Malassezia furfur</th>
<th>Alternaria</th>
<th>Candida spp.</th>
<th>Aspergilus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>498</td>
<td>72</td>
<td>228</td>
<td>60</td>
<td>97</td>
<td>27</td>
<td>08</td>
<td>0</td>
</tr>
<tr>
<td>Female</td>
<td>106</td>
<td>06</td>
<td>58</td>
<td>01</td>
<td>17</td>
<td>11</td>
<td>04</td>
<td>05</td>
</tr>
</tbody>
</table>

Note: Fungi isolated in patients less than 05 are not shown in this table.

Table 3: Distribution of Fungi as to the Site of Infection.
Tricho. mentagrophytes was mainly isolated in Tinea cruris. Epidermophyton floccosum was mainly isolated from cases of Tinea cruris, all the patients were males except one. There were two isolates from Tinea capitis and two from Tinea corporis. Amongst the non-dermatophyte infections Pityriasis versicolor (caused by Malassezia furfur) was the most common infection. The males were predominant sexual group suffering from it, same as in the previous studies.3, 5 The commonest body sites involved were chest, back and abdomen. Alternaria was isolated from many different body sites of infection. Candida spp. isolated in intertrigo had caused maceration in groin and interdigital webs. Patients from whom sputum was examined and cultured presented with wheezing in chest and shadows in lungs. Wangiella spp. was isolated from a bilateral lesion on the angle of mouth. Corynebacterium minutissimum was isolated from a case of erythrasma in axilla.

Discussion

Fungi are amongst the few organisms causing communicable diseases, that is diseases acquired from infected animals or birds or from fomites they have engendered. Apart from those species usually associated with disease, transitional species exist which appear to be primarily saprobic species occasionally or rarely causing infections, therefore in infection control and public health issues related to different types of mycoses, study of their epidemiology is important. It is important to know about the prevalent species in each country, and also in different areas of country, as they vary from country
Analyzing the data collected showed that Tinea corporis was the commonest type of infection. High incidence of Tinea corporis has also been noted in many parts of India.14

Regarding the incidence of sex there was male preponderance in the infections. The same male preponderance was also observed in other studies in India14 and other tropical areas.15 The reasons for this male preponderance are not known, as females are usually more conscious of their disease due to cosmetic reasons, suggesting that the activities of hormones, especially androgens, could be an important predisposing factor.15

Microsporum ferrugineum was found to be the main Microsporum species isolated. This species is endemic in China, Taiwan, Japan, South Pacific Islands, Congo and Angola. It has rarely been observed in United States of America, it has not been mentioned in a survey of fungi causing Tinea capitis in Iraq2, it has not even been reported from India14, it was first reported from Pakistan in 1970.2

Alternaria spp., which is a ubiquitous mould, was the most common non-dermatophyte fungus isolated and was isolated from specimens from all the different sites of body, its isolation and association with dermatomycoses was first reported from Pakistan in 19826, and from India in 1985 and 1990.16

Wangiella dermatitidis, a dematiaceous hyphomycete and an important etiologic agent of phaeohyphomycosis17, Fonsecaea dermatitidis and Phialophora dermatitidis were isolated from cases of chromoblastomycosis and were also reported before.7 It is assumed that the current study and similar studies conducted in other areas of Pakistan will give an understanding of the pattern of mycotic infections that generally prevail in different regions of the country.

Acknowledgements
Kind help of (late) Dr. Durr-e-Kamil, dermatologist of Lady Reading Hospital is greatly appreciated.

References